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Corn Borers Chew Way Through 68 Million Bushels

1959 Loss Totals 1.7% of Crop; Worth Almost $72 Million

WASHINGTON — European corn borers last year destroyed nearly 68 million bushels of corn grown for grain utilization, valued at almost $72 million, the U.S. Department of Agriculture has reported.

The loss, amounting to 1.7% of the total crop, is based upon estimates compiled by federal and state workers in 18 states in which the major part of the U.S. corn crop is produced

(Turn to CORN BORER, page 8)

Production Starts in Olin Mathieson's Enlarged Texas Plant

—See Photos on Page 4—

PASADENA, TEXAS—Production in the expanded high analysis fertilizer plant of Olin Mathieson Chemical Corp. here began May 11.

In ceremonies marking full scale output, S. L. Nevins, vice president of the corporation, activated a $1.5 million addition to the existing plant.

The new section gives the plant a capacity of more than a ton of pelletized fertilizer a minute, a 40% gain over former output. With the addition, Olin Mathieson is adding new grades to its Ammo-Phos line, including 15-15-15, 16 48-0, 14-28-14, 7-28-28, 9-36-18, 13-39-13 and 12-24-24.

Texas Gulf Sulphur To Acquire Potash Properties in Utah

SALT LAKE CITY — The Delhi-Taylor Oil Corp. of Dallas has announced an agreement whereby Utah potash fields on the Grand-San Juan County line along the Colorado River will be developed.

The firm, which has been doing much exploratory and development work on the project, has signed an agreement with Texas Gulf Sulphur Corp. whereby the latter firm will acquire and commercially develop the property.

As a result of Delhi-Taylor exploration work which began in 1953, two large potash reserve areas have been discovered and demonstrated through core drilling.

The Cane Creek anticline area, just off Dead Horse Point, indicates a long-term, high-grade potash reserve that promises to become a new and major domestic source of the mineral.

Engineers earlier had forecast that the deposit was sufficient to last 41 years at a 1,000-ton-per-day mining rate of material for the agricultural fertilizer industry.

Since that date two years ago, the firm has enlarged its reserves by further drilling. Some 300 persons would be employed initially in the mine and beneficiation plant.

Delhi-Taylor announced that it had been successful earlier in getting freight rates to the point where they would assure a successful operation in Utah with delivery of potash to Midwest markets for use in fertilizer.

Pesticide Industry Opposes Wildlife Consultation Bill

WASHINGTON—The pesticide industry sees no need for legislation requiring federal agencies to consult with the Fish & Wildlife Service and state authorities before engaging in pest control programs, Lea S. Hitchner, executive secretary, National Agricultural Chemical Assn., told a recent meeting of the House Wildlife Subcommittee.

Mr. Hitchner and members of various government agencies testified at a subcommittee hearing in Washington on a bill (HR 11502), introduced by Rep. Leonard G. Wolf (D., Iowa). The bill would require any federal agency in, or planning to engage in, a program of pest control to consult in advance with the Fish & Wildlife Service and appropriate state authorities before undertaking such programs.

Said Mr. Hitchner, "The agricultural chemical industry is fully in accord that there should be close coordination and exchange of information between the various agencies interested in pest control. These agencies include the Food & Drug Administration, the U.S. Public Health Service, the Fish & Wildlife Service and various segments of the U.S. Department of Agriculture. The primary responsibility, however, under existing federal laws and also under supplementary state laws, is administered by the U.S. Department of Agriculture.

"We see no need for legislation involving only the Fish & Wildlife Service. By administrative action, the various agencies could very readily set up a committee to coordinate its activities. We believe this has been done in the last few months."

Another offering testimony was Daniel H. Janzen, director of the Bureau of Sport Fisheries of the Fish & Wildlife Service. He said the objectives of the proposed bill to con-

(Turn to OPPOSES, page 5)

Calspray May Build Fertilizer Plant in Iowa

FT. MADISON, IOWA—California Spray-Chemical Corp., Richmond, Cal., has taken an option on 325 acres of land near here for the possible erection of a major Midwest fertilizer plant.

Calspray officials said that plans for the plant hinge on the outcome of current hearings before the Federal Power Commission in Washington for allocation of an adequate supply of natural gas for the proposed plant.

Depending on the results of this hearing, the plant, if built, would be intended to serve the entire Midwest with a complete line of pelleted and liquid fertilizer. It would produce anhydrous ammonia and make its own nitric acid.

The plant would have complete loading, storage and bagging facilities and would be serviced by rail, truck and barge.

New Areas in Four States Put Under Fire Ant Regulations

WASHINGTON—Six counties and parts of 19 additional counties and parishes in Alabama, Georgia, Louisiana and Mississippi are being regulated for the first time, effective May 10, because of imported fire ant infestations, the U.S. Department of Agriculture has announced.

Areas regulated for the first time:

Alabama: Lamar, St. Clair and part of Pike County.

Georgia: Bibb, Mitchell and Seminole and parts of Early, Miller, Peach, Schley and Sumter counties.

Louisiana: Parts of Bossier, East Carroll, Franklin, Jefferson Davis, Morehouse, Tensas, Union and West Carroll parishes.

Mississippi: Adams and parts of Calhoun, Carroll, Choctaw, Franklin and Scott counties.

USDA SAYS:

No Withdrawal Of Registrations For 2, 4-D Use

WASHINGTON—The U.S. Department of Agriculture has issued a statement that there has been no withdrawal of its registrations for uses of 2,4-D.

The department said it made the statement in response to "many questions" raised about the status of the chemical for control of weeds.

USDA said that 2,4-D has been widely used for the control of weeds for many years and that registrations given under provisions of the Federal Insecticide, Fungicide and Rodenticide Act for the use of 2,4-D are supported by broad experience and research conducted by public and pri-

(Turn to 2,4-D, page 8)

FOOD COSTS WOULD SOAR

Farm Festival Gets View of Agriculture Without Pesticides

By DR. GEORGE C. DECKER
University of Illinois

EDITOR'S NOTE: In these days of wild and bitter attacks on use of chemicals in agriculture, the following article is a particularly thoughtful and effective answer to those who would ban or restrict use of pesticides. Dr. Decker points out the consequences of such action against the background of the historical forces which have made American agriculture what it is today. The article is text of a talk given by Dr. Decker at the recent University of Illinois Farm and Home Festival. Dr. Decker is principal scientist and head of the section of economic entomology, Illinois Natural History Survey and Illinois Agricultural Experiment Station.

v v

To one who has given the matter some thought, justifying the use of chemicals in agriculture falls in the same category as elaborating upon the obvious or gilding the lily. The facts can be stated in a very few words.

If the use of agricultural chemicals were to be banned tomorrow, the yield of many crops would be reduced by from 10 to 90% and surplus stocks would soon disappear. The price of most food items sold in stores would double, some would treble, while still others, notably fruits and vegetables, would totally disappear from the open markets. A detailed amplification of this statement would fill several volumes, but we shall try to develop at least a portion of the picture.

Broadly speaking, agriculture may be regarded as the mother of chemistry, or more correctly, agriculture from beginning to end is chemistry. In their everyday life processes, growing plants, through the mysterious phenomenon called photosynthesis,

(Turn to VIEW, page 10)

90% CONTROL ACHIEVED . . .

Subsurface Application of Volatile Herbicides More Effective, Says USDA

WASHINGTON—Subsurface application—a new technique for applying volatile herbicides — increases effectiveness of these evaporative weed-killers, according to the U.S. Department of Agriculture.

The new application technique was demonstrated at Stoneville, Miss., with an experimental tractor-powered, two-row, rear-mounted cultivator-sprayer. The sprayer could be easily revamped for treating more than two rows at once. It was used to apply EPTC (ethyl N,N-di-n-propylthiolcarbamate) herbicide in a thin band under the surface of cotton seedbeds before planting.

The treatment resulted in 90% control of weeds compared with 74% control when the chemical was sprayed on the soil surface and mixed in with a rotary hoe. Weed control was not increased by mixing the soil with a rotary hoe after subsurface spraying.

Chester G. McWhorter, plant physiologist of USDA's Agricultural Research Service and the Mississippi Agricultural Experiment Station, and Onnie B. Wooten, Jr., ARS agricultural engineer, conducted the studies. They suggest that subsurface application of chemicals can be used several ways to control weeds in different crops. Herbicides could be applied before or during planting, they say; however, the risk of crop injury would be reduced by planting after most of the herbicide evaporates.

Dr. McWhorter and Mr. Wooten also report that considerably less of certain chemicals is needed for subsurface spraying than for surface spraying because the herbicides are volatile and can be accurately placed for greatest efficiency in killing germinating weeds. As the herbicides slowly evaporate, they move up through the soil and kill germinating weeds—even though the weeds may not be in direct contact with the treated soil layer.

Volatile herbicides evaporate rather quickly when sprayed on the soil surface. Much of this is caused by exposure to light and high surface temperatures. Weeds are difficult to control when they germinate slowly from lower soil depths, and so the amount of chemical usually must be increased to insure good control.

The spraying device consists essentially of two blades, turned sideways to form a V. These blades move horizontally at depths of 2 to 6 in.—without collapsing the built-up seedbeds. As a layer of soil is raised umbrella fashion by each blade, herbicides are sprayed to the rear. Layers of soil falling back in place cover bands of treated soil about ½ in. thick and up to 16 in. wide.

Spraying can be done in various widths by changing and adjusting the nozzles. Other adjustments make possible spraying in rows spaced 36 to 42 in. One, two, or three nozzles were used in the test to apply 5 lb. of EPTC in 40 gal. of water per acre to give a variety of distribution patterns. The nozzles operated under a pressure of 40 lb. sq. in. and were installed in the V's formed by the blades. Effective work was possible at speeds up to five miles per hour in loam soils, but heavy clay stuck to the blades and hindered treatments.

Farm Editor Contest Announced by NPFI

WASHINGTON — A nationwide contest to determine the "Newspaper Farm Editor of the Year" has been established under the sponsorship of the Newspaper Farm Editors Assn. and the National Plant Food Institute as an annual award, announced Paul T. Truitt, president of NPFI.

NPFI becomes the first organization to have a jointly-sponsored contest with the newspaper farm editors.

Mr. Truitt explained that "the contest is designed to honor newspaper farm editors for their editorial contributions to efficiency in farming and for their over-all excellence in service to agriculture.

"Contributions of newspaper farm editors to improve the efficiency of agriculture too long have been taken for granted. We hope the award will give deserved recognition to these outstanding writers who so effectively work in the best interests of agriculture, which is in the best interests of the national welfare."

The award will be in the form of a scroll designating the recipient as the "Newspaper Farm Editor of the Year." The presentation will be made at the annual winter meeting of the association in Chicago.

Appointed in Texas

EL PASO, TEXAS—Bernard Rodsky, with offices in the First National Building, El Paso, has recently been appointed to represent Atlas Mineral Products Co. in the western Texas territory. This announcement was made by Joseph A. Snook, president of Atlas.

Located in Mertztown, Pa., Atlas manufactures acid proof construction materials . . . acid proof cements, protective coatings, tank linings and rigid plastics. Mr. Rodsky will handle the entire line of materials.

Richardson Announces New District Manager

CLIFTON, N.J.—The appointment of Joe R. Vogel as Philadelphia district manager, effective Jan. 1, 1960, was announced here by officials of Richardson Scale Co., engineers and manufacturers of automatic weighing and proportioning equipment and controls.

Joe R. Vogel

Mr. Vogel three years ago opened a Richardson district sales office at Boylston Center, Mass., to serve the New England area. Prior to that assignment he spent a year in the sales engineering department. He also received training in materials handling and the application of automatic weighing in various industries in Richardson's service department.

Calspray Announces Two Branch Promotions

RICHMOND, CAL.—Jack Edminster and Richard S. Witmer have been named branch managers for California Spray-Chemical Corp.

According to Harold Matson, district manager, Mr. Edminster will manage the Pacific Northwest branch. In his new post, Mr. Edminster will be responsible for supervising the sale and merchandising of garden and home products in the area.

Charles H. Lupsa, district manager for Calspray's New England territory, said Mr. Witmer would manage the Hudson Valley area with headquarters in Kingston, N.Y. He was formerly a sales representative for Calspray in Pennsylvania.

Soil Moisture Study Under Way in Oregon

CORVALLIS, ORE. — A new research tool that could help agricultural scientists solve some of Oregon's irrigation and fertilization problems is being developed at the Oregon State College Agricultural Experiment Station.

The new project will try to work out ways to keep constant amounts of moisture in soil being used in irrigation and plant-growth research, reports Dr. John W. Wolfe, Oregon State College agricultural engineer. The project is being supported by a $17,500 grant from the National Science Foundation.

Agricultural scientists like to keep everything that can affect their experiments at a set level, Dr. Wolfe explained. At present, however, experimental plants have to be watered at intervals, and the amount of water in the soil around the plants varies from day to day.

Dr. Wolfe has been experimenting with a method that uses a stream of air to carry water vapor into pots of soil. By carefully regulating the flow of air, temperature and pressure, he found it was possible to get the water vapor to condense onto soil particles.

The new research will try to develop equipment and techniques that will use this method to supply moisture to potted experimental plants at the same rate they use it, Dr. Wolfe said. This would give agricultural research scientists a way to keep a constant amount of moisture spread uniformly through soil being used in their experiments.

Such a method of supplying moisture to experimental plants could help agricultural scientists develop better methods of predicting and timing irrigation needs, as well as making possible expanded basic research on how plants use water to carry on their life processes.

New Regulations for Pest Control Operators Adopted in California

SACRAMENTO—Regulations governing agricultural pest control operators have been amended by the California Department of Agriculture.

William E. Warne, director of agriculture, said that some of the changes were in response to amendments made in the basic law by the legislature, and others were made on the basis of experience gained by the department in administration of these regulations during recent years.

"One of the changes," Mr. Warne said, "is to require all persons engaged for hire in the business of agricultural pest control to 'keep each ground rig used in the application of pesticides and each nurse rig conspicuously and legibly marked with the name and address of the operator, and the deliverable capacity of the tank or hopper'."

"County agricultural commissioners, who assist the department in enforcement of the laws governing agricultural pest control operators, recommended adoption of this requirement to aid them in checking on the operations of firms engaged in treating home plantings and similar door-to-door agricultural pest control."

Another department amendment of the regulations emphasized that operators should follow standard practice in accordance with the recommendations of the manufacturer or registrant of the economic poison, and within the limitations contained in official recommendations.

In general, pest control operators are required by the regulations to use pesticides only for those purposes for which they have been officially registered. Because it is difficult for operators to determine readily the scope of registration for each product, the amended regulations permit an operator to apply a registered product for purposes other than those authorized by the registrant, providing the grower or owner of the crop files a written request for the deviation with the county agricultural commissioner.

The regulations also emphasize that no pesticide chemical, or emptied container thereof, shall be dumped or left unattended where it does, or is likely to present, a hazard.

A public hearing was held on the proposed amendments of the regulations Feb. 25 and no objections to the changes were received. The amended regulations were filed with the secretary of state on April 21 and become effective May 21, 1960.

Sales Representative Named by Geigy Co.

ARDSLEY, N.Y.—Raymond J. Jefferson has been appointed a sales representative for Geigy Agricultural Chemicals Division of Geigy Chemical Corp. He will represent the company in Indiana and Kentucky.

R. J. Jefferson

Mr. Jefferson was recently employed as a fieldman for the New York Farm Bureau and for five years he was Northeast regional manager for Olin Mathieson Chemical Corp. He was graduated from the University of Vermont, is married and has four children. He will make his home in Indianapolis, Ind.

MICHIGAN GOVERNOR REPORTS ON DISEASE FIGHT

EAST LANSING, MICH.—Local governmental units in Michigan spent about $6 million last year to aid in the Michigan battle against the Dutch elm disease.

That report is made by Gov. Williams, who points out that this disease control program is effective because cities were willing to share with the state in the costs.

"Generally the program has been very successful," the governor said.

"Evidence clearly indicates that where good control programs exist it has definitely been possible to reduce the degree of Dutch elm infestation and at an economical cost," he said.

However, Mr. Williams warned that the disease "is spreading faster than control programs can be made effective" but said there wasn't enough money in the state's general fund to expand Michigan's program.

The governor has recommended an increase of $24,600 for work of the department's plant industry division, a total of $39,500 for fighting the gypsy moth and more than $71,000 for Dutch elm and oak wilt programs.

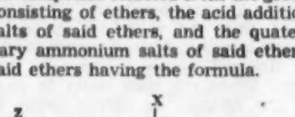
In asking for more money for control programs the governor cited three outbreaks of Japanese beetle infestations in southern Michigan last year. In one area where about 18,000 acres were treated, the state paid about $20,000 of the total $100,000 cost of the treatment program.

"The outlook for eradication (of the gypsy moth) in the near future is good," the governor said.

PATENTS and TRADEMARKS

2,935,439

Method of Inhibiting Growth of Fungi. Patent issued May 3, 1960, to Howard B. Wright, Lake County, and Marjorie B. Moore, Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill. A method of combatting the growth of a fungus which comprises applying to a growing fungus a fungicidal amount of a chemical compound selected from the group consisting of ethers, the acid addition salts of said ethers, and the quaternary ammonium salts of said ethers, said ethers having the formula.



wherein R is an alkylene group having from 2 to 6 carbon atoms inclusive, NA is from the group consisting of dialkylamino, morpholinyl, pyrrolidinyl, N-methylpiperazinyl and piperidinyl, and X, Y and Z are from the group consisting of hydrogen chlorine and bromine with the further proviso that at least one of X, Y and Z must be selected from the group consisting of chlorine and bromine.

2,935,443

Method of Protecting Material Against Fungi Comprising Applying a Heavy Metal Complex of a 1,2-Naphthoquinone 1-Oxime. Patent issued May 3, 1960, to Glentworth Lamb, Stamford, and James W. Clapp, Darien, Conn., assignors to American Cyanamid Co., New York. A method for protecting organic materials susceptible to attack by fungi which comprises applying to said material at least one heavy metal complex of a 1,2-naphthoquinone 1-oxime.

2,935,444

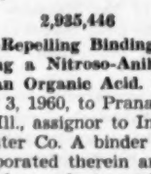
Parasiticidal Agent and Process for Producing Same. Patent issued May 3, 1960, to Louis G. Nickell, Port Washington, N.Y., Frank C. Pennington, Cedar Rapids, Iowa, and Isaiah A. Solomons, Garden City, N.Y., assignors to Chas. Pfizer & Co., Brooklyn, N.Y. A composition for inhibiting pathogenic fungi in plants, which consists essentially of from 0.001% to 15% of 2-(a-hydroxy-p-methoxybenzyl)-4-hydroxypyrrolidine and an agriculturally acceptable carrier.

2,935,445

N-Trichloromethylthio-1,2,3-Benzotriazine-4-one as a Novel Nematocide. Patent issued May 3, 1960, to John F. Hosler and William B. Hardy, Bound Brook, N.J., assignors to American Cyanamid Co., New York. A method of controlling nematodes in the soil which comprises applying thereto N-trichloromethylthio-1,2,3-benzotriazine-4-one.

2,935,446

Rodent-Repelling Binding Cord Incorporating a Nitroso-Aniline Stabilized by an Organic Acid. Patent issued May 3, 1960, to Pranas Jucaitis, Chicago, Ill., assignor to International Harvester Co. A binder cord having incorporated therein an effective amount of a rodent repelling compound of the following formula

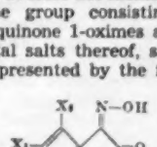


where one of X, Y and Z represent an amino radical and the remaining two of said X, Y and Z are hydrogen; said compound being stabilized with substantially a stoichiometric equivalent of an organic acid capable of stabilizing said compound against deterioration by carbon dioxide.

2,935,440

Method of Protecting Organic Material Against Fungi Comprising Applying a 1,2-Naphthoquinone 1-Oxime. Patent issued May 3, 1960, to Glentworth Lamb, Stamford, and James W. Clapp, Darien, Conn., assignors to American Cyanamid Co., New York.

A method for protecting organic material susceptible to attack by fungi which comprises applying to said material at least one member selected from the group consisting of 1,2-naphthoquinone 1-oximes and the alkali metal salts thereof, said oximes being represented by the formula

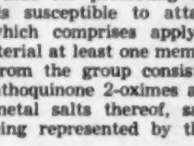


in which X_1-X_4 are selected from the group consisting of hydrogen, hydroxy, alkoxy and halogen.

2,935,441

Method of Protecting Material Against Fungi Comprising Applying a 1,2-Naphthoquinone 2-Oxime. Patent issued May 3, 1960, to Glentworth Lamb, Stamford, Conn., and James W. Clapp, Darien, Conn., assignors to American Cyanamid Co., New York.

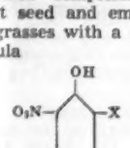
A method for protecting organic materials susceptible to attack by fungi which comprises applying to said material at least one member selected from the group consisting of 1,2-naphthoquinone 2-oximes and the alkali metal salts thereof, said oximes being represented by the formula



in which X_1-X_4 are selected from the group consisting of hydrogen, hydroxy, alkoxy and halogen.

2,935,392

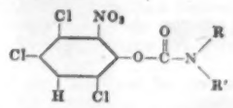
Method and Composition for the Control of Grass Weed. Patent issued May 3, 1960, to Dorsey R. Mussell, Clare, Mich., assignor to The Dow Chemical Co., Midland, Mich. A method for the control of gramineous weeds which comprises contacting germinant seed and emerging seedlings of grasses with a compound of the formula



wherein X is selected from the group consisting of tertiarybutyl and tertiaryamyl radicals, in amount sufficient to suppress the growth of the grasses.

2,933,383

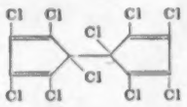
Method of Combating Weeds Using N-Substituted Carbamates of 2,4,5-Trichloro, 6-Nitro Phenol. Patent issued April 19, 1960, to Joseph A. Lambrech, Charleston, W.Va., assignor to Union Carbide Corp., New York. The method of combatting weeds which comprises applying to a locus to be protected a herbicidal amount of a compound having the general formula:



wherein R is selected from the group consisting of hydrogen, lower alkyl and hydroxyl substituted lower alkyl and R' is a member selected from the group consisting of hydrogen, hydroxyl, lower alkyl and hydroxyl substituted lower alkyl.

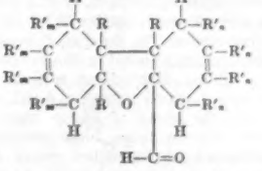
2,934,470

Insecticidal Perchlorocarbon. Patent issued April 26, 1960, to John T. Rucker, Lewiston, N.Y., assignor to Hooker Chemical Corp., Niagara Falls, N.Y. A process for protecting material susceptible to attack by insects which comprises applying to said material an effective amount of a perchlorocarbon having the formula:



2,934,471

Synergistic Insecticide Composition Comprising a Pyrethrum-Type Toxicant, an Insecticide and a Butadiene Furfural Condensation Product. Patent issued April 26, 1960, to Roy E. Stansbury, Bartlesville, Okla., assignor to Phillips Petroleum Co., Bartlesville. A method of killing insects which comprises applying to insects an insecticidal composition comprising an insecticidal ingredient, a pyrethrum-type toxicant, and a small repellent and synergistic amount of a compound having the following general structural characteristics:



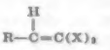
wherein R is selected from the group consisting of hydrogen and methyl R'm is selected from the group consisting of hydrogen, methyl and chloro, R'n is selected from the group consisting of hydrogen, methyl and chloro, at least one R is hydrogen, at least two R'm's are hydrogen, and at least two R'n's are hydrogen.

2,934,420

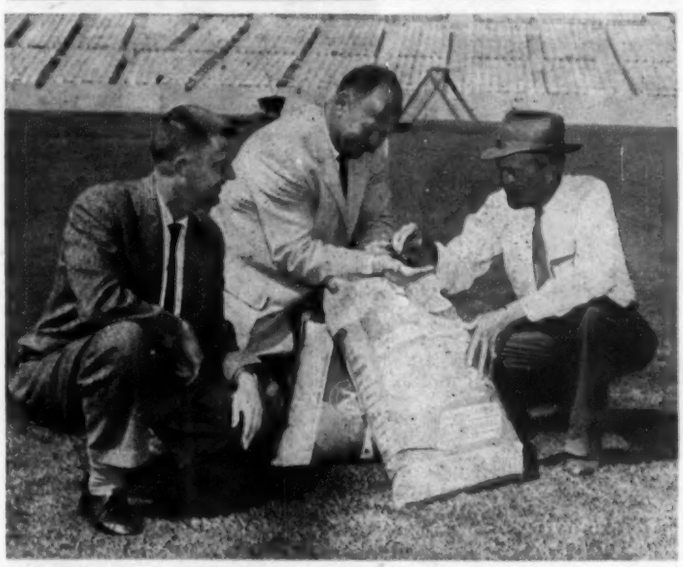
Pesticidal and Herbicidal Compositions of Matter. Patent issued April 26, 1960, to Richard S. Cook, Rockledge, and W. E. Craig, Philadelphia, Pa., assignors to Rohm & Haas Co., Philadelphia. A composition adapted to control fungi, mites, insects and undesirable plant growth comprising β-selenocyanoethyl cinnamate in admixture with an adjuvant, the cinnamate being present in an amount at least sufficient to exert a controlling effect.

2,933,429

Method of Repelling Rodents Comprising Applying a Member of the Group Consisting of an Ethylene Dinitrile and Ethylene Dicarboxylic Acid Esters. Patent issued April 19, 1960, to Thomas H. Wicker, Jr., and Newton H. Shearer, Jr., Kingsport, Tenn., assignors to Eastman Kodak Co., Rochester, N.Y. A method for protecting property and materials normally consumed as food by rodents from rodents by imparting rodent repellency thereto which comprises applying to said property and materials a compound having the structural formula:



wherein R is selected from the group consisting of alkyl radicals containing 1-4 carbon atoms, phenyl and chlorophenyl and X is selected from the group consisting of —CN and —COOR' wherein R' is an alkyl radical containing 1-4 carbon atoms.



PLANT FOOD FOR CANDLESTICK—Shown above, left to right, are Don Allison, Hercules Powder Co., San Francisco, Karl Kolb, Agriform of Northern California, Inc., and Matty Schwab, Jr., grounds supervisor for the San Francisco Giants, examining Hercules Nitroform granular fertilizer, which was used on San Francisco's new National League Candlestick Baseball Park. Nitroform is manufactured by Hercules at Woonsocket, R.I., and by the end of the year also will be made at the firm's plant in Hercules, Cal. Agriform of Northern California is distributor of nitroform.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of $25 must accompany each notice of opposition.

Pre-Kill, in capital letters for chemical for killing crabgrass or other weeds. Filed April 20, 1959 by Vaughan's Seed Co., Chicago. First use on or about Jan. 23, 1959.

Chevron Design for chemicals and chemical intermediates used in insecticides, herbicides, fungicides, livestock and poultry sprays, animal and poultry dips and numerous other chemical materials. Filed July 2, 1958 by Standard Oil Co. of California. First use Feb. 26, 1942 on insecticides.

Minral-Gro, in capital letters, for soil conditioner. Filed June 3, 1959 by The Buffalo Slag Co., Inc., Buffalo, N.Y. First use March 19, 1959.

Vita-Life, in capital letters, for liquid fertilizer. Filed Oct. 22, 1959, by The Vita Life Corp., Enid, Okla. First use May, 1954.

INSECT, PLANT DISEASE NOTES

Leaf Curl Disease Hits Texas Peaches

COLLEGE STATION, TEXAS—Leaf curl of peach occurs in all peach growing areas. The fungus disease is more commonly found in the northern half of Texas. Records show that the disease is noticed more in April and May during years of above average rainfall. Young trees from nurseries in northern states often carry the disease. Nectarines and peach-almond are susceptible.

The leaves become curled, thickened and distorted. Affected leaves appear white or pink in color. Fruits are misshapen with smooth areas. The entire tree may lose its leaves early in the season.

Loss of leaves prevents normal manufacture of true plant foods such as carbohydrates, fats and proteins. Without a normal supply of true plant food the tree produces a poor crop of fruit. Too, the tree is weakened so that it is unable to withstand damage by drouth, cold weather and other pests.

No cure is available. Damaged trees should have proper care through the remainder of the year. Fertilize, cultivate and water, if possible, so as to obtain optimum growth. Control other pests. A bordeaux mixture or fixed copper spray during the winter will prevent the disease from damaging the tree next year.—Harlan E. Smith.

Aphid Build-Up Noted In New Mexico Report

UNIVERSITY PARK, N.M.—Spotted alfalfa aphids and pea aphids are building up to damaging infestations in most areas of the state, warned John J. Durkin, entomologist with the New Mexico State University Extension Service.

He advised alfalfa growers to check their fields for aphid damage and dust or spray if a sufficient number of the pests are present to warrant control. Fields should be checked in several places, not just along the side of the road. If large numbers of wingless aphids and droplets of honeydew are found on the leaves, it is time to use insecticides, Mr. Durkin said.

May Armyworm Raids Predicted for Tennessee

KNOXVILLE, TENN.—An armyworm enlists for wholesale destruction of small grain and other crops when it's an inch or less; and what a brigade of them can do in a single night is amazing.

May is the month the slender, green and black striped worm appears as part of a ravaging army. According to R. P. Mullett, University of Tennessee extension entomologist, armyworms like fields of heavy growth. Small grain crops, legumes and grass fields are all targets. What is bad is the way armyworms clean out one field, then move on to greener pastures.

"The armyworm is a species of cutworm, with which it might be confused," Mr. Mullett said. "Many kinds of cutworms also may be found in crop fields in the spring. Young armyworms are pale green with faint darker lines and have the looping method of travel. The older worms attain a length of 2 in., are smooth, greenish in color with blackish stripes down the center of the back and each side.

"Until the worms are one-third to one-half grown, they cause little damage. It is prior to this they should be discovered.

"As the worms approach maturity, they begin climbing the crop stalks and clipping the heads therefrom, causing typical armyworm damage. This type of feeding occurs at night, and many cases have occurred when farmers have lost a large portion of their wheat or barley fields during one such night's attack. Under conditions of severe infestations, it is possible to hear the noise of the worms feeding in a field.

"Once infestation is located, steps for immediate control should be taken. No waiting observation period should be allowed."

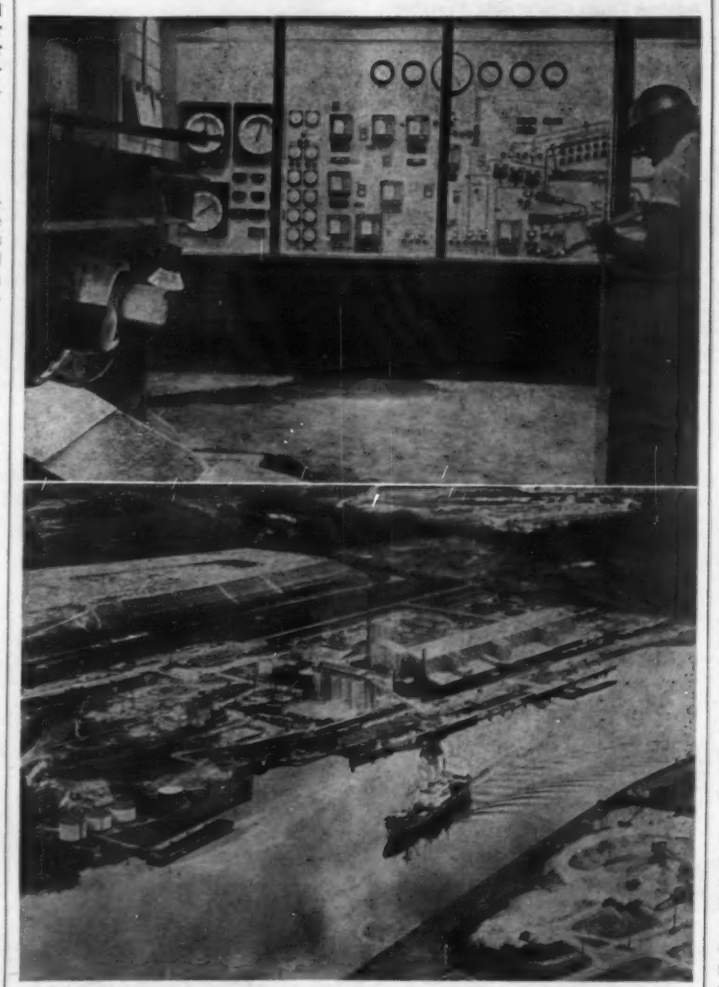
Pea Aphids Increase In Southeast Kansas

MANHATTAN, KANSAS — Pea aphids have increased in southeast Kansas and can be expected to cause considerable damage to alfalfa if cool rainy weather continues. Some fields are being cut early to prevent damage.

A survey of northwestern Kansas shows planted wheat to be almost free of wheat curl mite. From Smith County west there are many large fields of volunteer wheat that have light to medium infestations of mites. Evidence of disease is not as apparent as in the southwest which was reported on in an earlier report. As in the southwestern area, most fields of volunteer wheat are being plowed and most of the mites will be destroyed.

Insecticide applied before or at corn planting time is the only protection against rootworm damage. The problem is most important in the north central irrigated area where the western corn rootworm predominates and corn follows corn on the same land. Broadcast applications of insecticides must be worked into the soil immediately after application. Band treatments must be applied so the soil on all sides of the seed is contaminated with insecticides.

Aphids can be expected on the growing tips of ornamentals and flowers. Watch for aphids on peas, lettuce, and radishes in the vegetable garden.—Leroy Peters and Dell E. Gates.



NEW FERTILIZER PLANT—Olin Mathiesen Chemical Corp. last week began production at its new $1,500,000 facilities at Pasadena, Texas. The new unit is an addition to the existing plant and will increase the output by some 40%, according to Sam L. Nevins, vice president. The new plant will manufacture high analysis ammonium phosphate. Above is control panel, nerve center for production in the new plant. Operator at right checks panel figures on his slide rule. Lower picture shows over-all setup of new facilities. At lower left is sulfuric acid plant, and in the center, main plant with newly-added portion. Gypsum mound is at upper left. Ship in channel is heading towards the Gulf of Mexico.

Insects Seen As Serious Threat to Alabama Pecans

MOBILE, ALA. — Insects could seriously injure the potential pecan crop in Mobile County if they are not controlled in time, reported W. L. Deakle, assistant county agent.

Some growers have reported the appearance of the May beetle or June bug. The May beetle hides in grass, leaves or brush during daylight hours and emerges at dark to feed on young shoots and leaves of pecans, oaks and other trees. They can appear in sufficient numbers to seriously defoliate the young growth of pecans, thereby hurting the nut crop.

May beetles usually stay around for only a few weeks.

The pecan nut casebearer causes severe damage some years. These insects pass the winter as partly grown larvae in a small cocoon usually attached where a bud joins the stem. When the buds begin to open in the spring, the larvae begin to feed on them and later they bore into the young tender shoots. The larvae go into the pupal stage next and then become moths. These moths lay eggs on the blossom end of the nuts. After the eggs hatch the new larvae feed on the buds just below the cluster of nuts for a few days and later feed on the nuts, boring into the base of the nuts.

Disease Attacks South Carolina Trees

CLEMSON, S.C.—A forest disease with leap-frog tendencies is at work in South Carolina forests. Fusiform rust, a disease that causes spindle-shaped cankers on the stem and branches of pine trees, completes its life cycle by going from canker to oak leaves and then back again to young growth of the pine.

It's one of the more serious diseases of southern pine forests. According to W. J. Barker, Clemson extension forestry leader, the disease produces orangish spores and is likely to alarm forest owners during spring months. The most susceptible species are loblolly and slash pine, but it will attack other types. "The killing action of fusiform rust is very slow. The main damage comes through weakening the tree at the point of attack. Once weakened by the canker, trees are often blown over by wind," Mr. Barker said.

FROST DAMAGES FRUIT CROP

PROVO, UTAH — Joel Barlow, county agricultural agent, estimated that the April 15 weekend frost damage in Utah County totaled an estimated $3 million.

The county's fruit-growing area will lose an estimated two-thirds of its crop this year. It is the second consecutive year damage to fruit crops has seriously hit the county.

The entire sweet cherry crop with exception of the Mapleton area appeared to be gone. Sweet cherries are the biggest fruit cash crop in the county.

Apricots appeared to be completely frozen, with peaches gone in most areas. Delicious apples suffered serious damage but Jonathans and Romes still showed promise.

Early strawberry blooms were damaged and there was damage to non-fruit crops including sugar beets, young alfalfa and some early garden crops.

Mr. Barlow said sour cherries and prunes did not show much damage at present while loss to the pear crop appeared spotty throughout the area.

Farmers attempted smudging but their efforts were ineffective in the 20° and 21° weather.

OPPOSES

(Continued from page 1)

serve wildlife were correct but the action was premature and a number of its provisions would make it administratively impractical.

He said the basic law on wildlife conservation should be amended to clarify procedures needed to provide the desired coordination and exchange of information.

Mr. Hitchner also felt the principles of the legislation were sound, but "there are emergency situations involving both agriculture and public health where any restrictions on financial assistance or aid would seriously curtail and endanger such programs, and any legislative requirements of the kind indicated in the bill would seriously jeopardize such situations.

"A coordinated committee appointed by administrative action could, in our opinion, much more efficiently exchange information under such conditions."

Mr. Hitchner then gave as an example the recent encephalitis epidemic in New Jersey, caused by disease-carrying insects, where immediate action had to be taken. He also referred to numerous examples of emergency pest outbreaks in agricultural areas involving food products where prompt action was necessary on the part of a single government agency.

Dr. W. L. Popham, deputy administrator of agricultutral research, spoke against the bill because it puts primary emphasis on protection of wildlife and thus subordinates other values to national welfare.

He said there is much misunderstanding and many misleading reports concerning USDA's pest control program and that there have been frequent consultations between scientists of the different agencies concerning the programs.

Mr. Hitchner also pointed out that the National Academy of Sciences is forming a committee of scientists to study the entire problem of pest control in relation to wildlife and the operation of the government agencies on its pest control programs.

"We believe that the study to be made by this committee and its report justify a delay on legislation at this time," Mr. Hitchner said.

Laboratory to Get Added Equipment

GULFPORT, MISS. — More than $50,000 in new equipment will be added to the U.S. Department of Agriculture chemical laboratory in Gulfport with the establishment of a Pesticide Regulation Branch.

C. C. Fancher, regional supervisor of the department serving 11 states in the Southern Plant Pest Control Region, said the "new equipment will make the Gulfport laboratory one of the best in the country."

The new program was initiated by Dr. T. H. Harris, head of the chemistry section, Pesticide Regulation Branch of the Plant Pest Control Division in Washington, D.C.

Mr. Fancher said the Pesticide Regulation Branch administers the Federal Insecticide, Fungicide and Rodenticide Act. The branch conducts tests to insure the insecticides will not result in injury to users or others who are exposed to them, and that the insecticides are effective for their purposes. He noted that the laboratory has analyzed samples from over 30 million pounds of insecticide formulations used in fighting the imported fire ant.

Vice President of Tennessee Corp. Dies

ATLANTA, GA.—Adolph Herrington Sterne, vice president of the Tennessee Corp., manufacturer of chemical fertilizers, died in a private hospital here May 5 after an illness of two weeks. He was 84, but was still active as an official of the chemical firm.

A native of Albany, Ga., Mr. Sterne had lived in Atlanta since 1914. He had been associated with the chemical fertilizer firm for the past 41 years.

MILL SUPERINTENDENT

SALT LAKE CITY, UTAH — J. Stanley Mitchell is new mill superintendent of Southwest Potash Corp., Carlsbad, N.M. He formerly was manager of the Garfield cobalt refinery of Calera Mining Co., Garfield, Utah. A graduate of metallurgy of Washington State University, he was metallurgist and later mill superintendent for Howe Sound Co. at its Chelan, Wash., copper properties.

Dr. Robert L. Beacher Named Southern Region Director of NPFI

WASHINGTON — Dr. Robert L. Beacher has been named southern regional director for the National Plant Food Institute, with headquarters at Atlanta.

Formerly southwestern regional director for the Institute, Dr. Beacher's region has been expanded to cover 12 states as follows: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia. He succeeds Dr. Samuel L. Tisdale, now with the Sulphur Institute.

Dr. Beacher was a professor of agronomy at the University of Arkansas before joining the Institute staff in 1957.

Paul T. Truitt, president of the Institute, said that "in no way will the regional services of the Institute be impaired with the enlargement of the new region, but, on the contrary, current programs will provide a closer working relationship between the fertilizer industry and the research and educational leaders in the land-grant colleges."

Dr. Beacher is a graduate of Pennsylvania State University, where he received his bachelor of science degree in soils in 1946 and his doctorate in 1949. He is author of more than 30 articles in the field of soil fertility and crop production.

He was invited to the International Rice Commission meeting in Malaya in 1955 as a guest speaker and consultant for FAO, United Nations Organization, and spent several weeks in Cuba in 1955 and 1956 as consultant on rice and soil testing problems for Cuban interests. He served as fertilizer consultant for International Cooperation Administration in South Korea during the summer of 1956.

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A WORLD OF EXPERIENCE

'Rule of Reason' Must Prevail in Dealing with Farm Chemical Problems, USDA Official Declares

By W. L. POPHAM
Deputy Administrator, Agricultural Research Service

EDITOR'S NOTE—The following is a reprint of a talk given by W. L. Popham, deputy administrator, Agricultural Research Service, U.S. Department of Agriculture, in which he discusses some of the current problems facing the fertilizer and pesticide industries. Mr. Popham made the talk at the annual conference of the North Central Branch, Entomological Society of America, held in Milwaukee March 24.

In the past two decades the profitable production of food has become a highly technical enterprise. It is hard for anyone not closely associated with farming to realize how utterly dependent on agricultural chemicals we have become.

This change is reflected in our vocabularies. Chemical terms have become integrated into our agricultural language. Tolerances . . . antibiotics . . . food additives . . . carcinogen . . . radioactive tracers . . . strontium 90 . . . these have become a part of every day language. Aminotriazole . . . diethylstilbestrol . . heptachlor . . . are topics of conversation in every household.

What has happened to focus so much attention on agricultural chemicals just now? What about the safety and wholesomeness of our food supply? Is the consumer being adequately protected? Why have chemicals become indispensable to farmers?

These questions are, of course, easier to ask than to answer. Some of the answers may be found in the war-time demands for increased food production with a greatly reduced labor supply; consumer demands for quality food; competition in agriculture, and, of course, the war-time development of DDT and the aerosol bomb, which not only made application quick and simple, but focused attention on a possible new approach to combating long-time natural enemies of farmers. Scientific and technological developments opened a new era—the chemical era—in a time of most urgent need.

Twenty years ago industry was producing some 50 basic chemicals for use on farms. Now this number exceeds 200. In total volume about 90% of farm chemicals were not available in their present form at the beginning of World War II. The biggest volume, of course, goes into fertilizers. In 1959, some 25 million tons were used on farms.

Pesticide requirements vary some from year to year, but total output is well over 500 million pounds. The two major weed control chemicals, 2,4-D and 2,4,5-T, totaled some 35 million pounds in 1959. Any such expansion leads to problems. The principal one in this case seems to be misuse.

In the 1930's, farmers spent in the neighborhood of $29 million a year for pesticides. Now the comparable expenditure is about $260 million. This trend in the use of effective pest controls is going to continue.

Some of the reasons are quite obvious. Consumers have come to expect quality and sanitation standards never dreamed of in past generations. Chemicals play an important role in providing those high standards. In many instances they offer the only economical means for controlling insects or diseases that can damage or completely destroy crops. Insecticides, fungicides and weed killers are tools of production. If properly used, they can do great good. Improperly used, some of them can be dangerous.

When the safety and wholesomeness of any part of our food supply is questioned it is a matter of grave concern to all. The secretary of agriculture recently stated: "The department considers that the safety of the nation's food is its first responsibility in carrying out assignments from the Congress. This principle guides USDA research programs and regulatory and service activities pertaining to foods and to the use of chemicals in food production and distribution.

"The department intends to continue and intensify its efforts to insure that American consumers get the foods they need and want, in adequate quantities at a reasonable price."

Are some of the chemicals that have done so much to improve our food supply likely to be harmful to people if minute quantities are present in foods they eat? An answer to this question is basic to intelligent action on the part of regulatory agencies—and to the research man who is seeking better and safer pest controls. Some chemicals are essential for good health in trace quantities, yet highly toxic when ingested at higher levels.

Selenium offers a classic example. When present in normal amounts in the diet—about 0.1 part per million—it has no measurable effect upon animal health. Animals on diets with subnormal amounts of selenium — 0.05 ppm—are not thrifty and show abnormalities of the muscular and internal organs. It is only when excessive amounts occur in the diet—say 5 ppm and above—that selenium produces toxic symptoms. Here we have a chemical, a carcinogen, a toxicant, which in proper amount contributes to animal health—but in excessive amounts is a lethal poison.

One of the most urgent situations facing us at the moment involves a definition of zero as applied to tolerances—what is significant? . . . and what is not? Methods of analyses are becoming more sensitive every day. "Zero" shifts with the analytical method applied—its sensitivity and its accuracy.

Current regulations followed by the Food and Drug Administration setting tolerances, whether zero or above, do not necessarily specify the methods or limitations of their acceptability. An acceptable use pattern today may be illegal tomorrow. There must be a level of significance below which a chemical can be used safely, or its use should be banned entirely.

This, it seems to me, is the key to our problem.

The California Department of Agriculture, the California State legislature and the Oregon State Board of Agriculture have asked the Food and Drug Administration within recent months to describe not only the methods used when announcing zero tolerances, but also their sensitivity. This may be a step in the right direction. At least it points up the situation confronting the manufacturer, the man who uses a chemical and state and federal enforcement officials.

An agency having responsibility for either registering or policing the use of agricultural chemicals is not in an enviable position today. There are questions of great urgency needing more comprehensive attention. We would like to see greater emphasis on preventive measures wherever they are applicable. Port-of-entry inspection excludes many pests that we don't now have; eradication programs avoid the necessity of living with some that might otherwise become established in limited areas and spread throughout the country.

In looking to the future we must be alert to new developments having a bearing on the residue problem. We must make wise use of the information we now have. But more than that, along with industry, we must search for chemicals that can be formulated into effective pesticides that offer a wider margin of safety to warm-blooded animals than those in use.

We must further expand our search for biological controls that can be substituted for chemicals in sensitive areas. We must explore in a more comprehensive way attractants, baits and lures which may be used independently or in combination with toxic materials.

Irradiation offers challenging possibilities. Most of you are familiar with the highly successful screwworm eradication program in Florida. There, for a year and a half, upwards of 50 million sterile flies were produced and released on a weekly schedule to compete with the native fly population. Once the mechanics were worked out, race suicide became a mathematical certainty. I am told that this technique offers possibilities also with mosquitoes, fruit flies and possibly such insects as the corn borer and corn earworm—a dramatic challenge to the residue problem.

Other biological approaches under study involve the release of diseased insects to infect and kill their own kind. We are watching with keen interest studies under way to produce milky-disease spores in volume and at low cost. Certain strains of this organism, Bacillus popilliae, are proving infective to the larvae of the European chafer as well as the Japanese beetle.

In spite of much that you have heard and read, we in regulatory work are deeply concerned about the effect of chemicals on fish and wildlife and on beneficial insects. This concern begins with the research man who studies a chemical as to usefulness, and it extends through to the time the chemical becomes an instrument for farm production.

The administrator of the Agricultural Research Service is coordinator for all research in the department. When it comes to chemicals, his interest and responsibility encompass the whole range of their effects. Unfortunately, at times it becomes necessary in making recommendations to weigh benefits against some possible adverse effects.

We are constantly pressing for more effective and safer pest controls. We seek to provide the widest possible margin of safety to consumers of agricultural commodities, to fish and wildlife, and to other national resources in areas subjected to treatment. This is our goal whether chemicals are applied by farmers individually, or as part of a state-federal cooperative program.

In dealing with current problems we must adhere to the rule of reason. We cannot legislate our way out of the residue problem. We must rely on the best scientific judgment available to determine under what circumstances pesticides, food additives and antibiotics may be used to public advantage.

Both the Department of Agriculture and the Department of Health, Education and Welfare have responsibilities for insuring a safe and wholesome food supply. USDA responsibilities are set forth in a series of statutes assigning specific regulatory functions to the department in achieving this goal. They include:

1. The Meat Inspection Act of 1906.
2. The Insecticide Act of 1910.
3. The Agricultural Marketing Act of 1946.
4. The Federal Insecticide, Fungicide and Rodenticide Act of 1947.
5. The Poultry Products Inspection Act of 1957.
6. Public Law 86-139 of 1959, which extends coverage of the Federal Insecticide, Fungicide and Rodenticide Act to include nematocides, defoliants, desiccants and plant growth regulators.

In addition to these laws, which involve only functions of USDA, the department was assigned certain specific responsibilities under Public Law 83-518, commonly referred to as the Miller Amendment to the Food and Drug Act. This act provides for the establishment of safe tolerances for pesticides that may leave residues in

MEN OF THE YEAR—Four U.S. Department of Agriculture scientists were honored recently as 1959 "Men of the Year in Service to Southern Agriculture" for their contributions to the successful eradication effort against the screwworm in the southeastern U.S. Screwworms attack livestock and wildlife, causing severe damage and death if not treated.

Certificates of recognition were presented to the scientists by Joe A. Elliot, left above, editor of Progressive Farmer magazine, during a ceremony held at USDA's Agricultural Research Center, Beltsville, Md.

The scientists are Dr. Edward F. Knipling, right above, director of the department's Entomology Research Division; Dr. Arthur W. Lindquist, second from right, in charge of the division's work on insects affecting man and animals, and Dr. Raymond C. Bushland, second from left, director of the department's Kerrville, Texas, entomology research laboratory. The fourth USDA scientist selected to receive the award, Alfred Baumhover of the Entomology Research Division, was not present for the ceremony. He is working on a project in the South Pacific.

or on raw agricultural commodities at time of marketing.

In recent years the trend in the Congress has been toward prescribing more preclearance of chemicals in dealing with possible residues or other forms of food contamination. This is good—it serves two purposes: (1) It gives greater assurance of safety to the consumer. (2) It gives food producers, processors, and distributors more precise guidelines for assuring the safety of their products.

Obtaining a registration for a new chemical formulation is not easy. As you are well aware, it may involve several years of research to prove its effectiveness and safety.

Only a few of the hundreds of potential new farm chemicals studied every year eventually reach the market. Many that do a superior job of killing insects or disease organisms are rejected in the laboratory because they do not meet exacting standards for safety in use. Registering a label for a pesticide is an important step in our whole scheme of food protection.

I will take a minute to review labeling procedures.

When a chemical company discovers or synthesizes a new chemical with potential pesticidal qualities, it requires three years or more to determine its usefulness. This is done by the manufacturer, usually in cooperation with state experiment stations and the Agricultural Research Service.

Once usefulness has been established and a treatment schedule developed for various crops, the company must determine what, if any, residue will remain on a crop if directions for use are followed. This is also a joint responsibility of industry and government.

If a residue in any amount remains on a crop or in the edible portions of a meat animal, it then becomes the responsibility of the Food and Drug Administration to determine the level at which residues are safe. Tolerances

AT CALIFORNIA FERTILIZER MEETING—Personalities pictured at the April 11-12 California Fertilizer Assn. conference at Fresno, are seen here. Top row, left, shows the legume fertilization panel appearing at the conference. They are, front row, from left, Dr. William L. Garman, The Best Fertilizers Co., Lathrop, Cal.; Dr. R. L. Luckhardt, Collier Carbon & Chemical Corp., Los Angeles, moderator; Dr. William E. Martin and Victor Osterli, University of California, Davis. Back row: Dr. Merton Love, University of California, Davis, and Dr. Malcolm H. McVickar, California Spray-Chemical Corp., Richmond, Cal. At right is head table group at annual banquet. Left to right: R. L. Luckhardt; D. W. Galbraith, Agriform of Northern California, Inc., president of California Fertilizer Assn.; Earl Coke, vice president, Bank of America, San Francisco, banquet speaker; Sidney H. Bierly, general manager, CFA, Sacramento; J. H. Nelson, Nelson Laboratories, Stockton, Cal., conference co-chairman; M. E. McCollam, American Potash Institute, San Jose, chairman, CFA soil improvement committee, and Dr. Perry R. Stout, chairman, department of soils and plant nutrition, University of California, conference luncheon speaker.

Middle row: Earl Coke speaking at CFA banquet, on "A Banker Looks at Fertilizer for Enhanced Loan Security." With him is Mr. Bierly. At right: Conference group on field tour of the San Joaquin experimental range, 30 miles northeast of Fresno. Below, general conference in session in auditorium. —Photos courtesy California Fertilizer Assn.

established for a given pesticide for different uses may vary from zero to several parts per million, depending upon the toxicity of the chemical and the uses for which it is intended.

Once a tolerance has been established and the manufacturer has submitted convincing evidence that the material, if used as directed, will meet the tolerance and at the same time occupy a useful place in agriculture, registration is granted.

The residue problem can be kept well in hand. The responsibility for meeting it, however, must be shared by:

The research agencies that are constantly seeking ways to improve and stabilize the production and quality of our food supply;

The extension people who carry new information from the laboratory to the farmer and the processor;

The farmer who produces food;

The processor who prepares the raw materials for consumer use;

The manufacturer who develops and markets chemicals for farm use; and,

The regulatory agencies which must assure consumer confidence in our food supply.

In closing, I should like to emphasize that chemicals are essential production tools in present-day agriculture. The problem is to use them intelligently and safely. This includes following directions on the label and consulting the state experiment station when in doubt.

While basic research can supply many of the answers to current problems, there is still the need to make prompt and proper application of new information as it is developed. We must mobilize and use the best scientific and professional judgment available to us. We must adhere to the rule of reason.

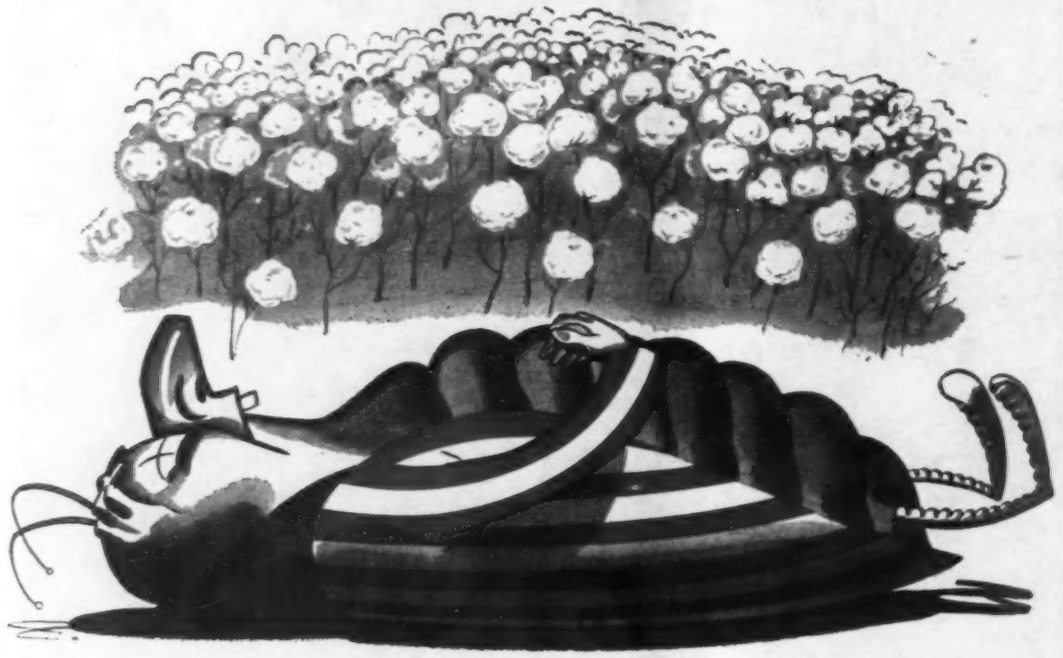
2,4-D

(Continued from page 1)

vate institutions. The labels for registered products contain instructions and adequate precautions for use to protect the public.

USDA, in concert with other responsible agencies of state and federal governments, continues to recommend the use of agricultural chemicals in conformity with directions and precautions appearing on the labels of products registered for interstate commerce, the statement said.

As in the case of other agricultural chemicals, studies are being continued on the use of 2,4-D for the control of weeds in pastures, forage and field crops. USDA is continuing research in cooperation with industry, state and other public agencies to insure the maximum benefit and safe use of agricultural chemicals.



Bo Weevil never had a chance against Frontier **BHC**

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P. O. BOX 545 WICHITA, KANSAS

Work to Start on New Agrico Plant

BELLE PLAINE, IOWA—Grading will start soon for the construction of the American Agricultural Chemical Co.'s $3,000,000 plant to be built north of Belle Plaine this year. The 77¼ acre plot purchased by the company last year is bounded on one side by the Chicago & North Western Railway.

While building activities are now starting, the fertilizer plant is not expected to get into operation this year, Belle Plaine representatives have been informed, but the plant will be used at first for storage and distribution. The plant is expected to employ about 60 persons.

Sudan Asks Bids for Fertilizer Supply

WASHINGTON—Bids are invited by the Sudan Gezira Board for supply of fertilizer, the Bureau of Foreign Commerce, U.S. Department of Commerce, has reported.

Included in the tender are: 27,000 metric tons of urea, granular or prilled, to contain 45/46% nitrogen and not more than 1.5% biuret; 175 metric tons of triple super phosphate, 45% water soluble P_2O_5, in powder form. Delivery of the urea is to be made at Port Sudan, between October, 1960 and February, 1961. The phosphate is to be delivered at the same port during May, 1961.

Tenders in sealed envelopes marked "Fertilizer Tender" should be sent to the assistant general manager (supplies), Sudan Gezira Board, Barakat, (Sudan), before 12 noon on May 24.

Terms and specifications are available on loan from BFC's Trade Development Division, U.S. Department of Commerce, Washington 25, D.C.

Geologist Joins IMC's Mining Department

SKOKIE, ILL.—Dr. Jack F. B. Silman of Toronto, Canada, has joined the mining and exploration department of International Minerals & Chemical Corp. as an exploration geologist. He will work from IMC's headquarters at Skokie, Ill.

Dr. Silman has nine years of varied experience in mineral exploration programs throughout Canada, including extensive uranium exploration in the Beaverlodge and Blind River areas.

He received his bachelor's degree from Queen's University in 1950 and his doctorate from Harvard University in 1958.

Irish Firm to Build New Sulphuric Acid Plant

DUBLIN, IRELAND—W. & H. M. Goulding Ltd., Ireland fertilizer manufacturer, has let a contract for a sulphuric acid plant with capacity of more than 200 tons a day. The plant will be in the Dublin area, and completion is expected in the summer of 1961.

CORN BORER

(Continued from page 1)

each year. The total quantity lost is the smallest since 1952.

Based on counties or districts surveyed in the fall of 1959, Nebraska, Iowa and Illinois suffered the severest losses. Of the 67,763,000 bu. estimated to have been destroyed by borers, more than 16 million bushels were lost in Nebraska, more than 15 million in Iowa and more than 10 million in Illinois. Losses totaled more than 6 million bushels in Indiana, more than 4 million in Minnesota and more than 3 million in Ohio.

Estimates are based on 1959 fall surveys of borer populations conducted by state entomological workers.

SPECIAL MERCHANDISING SECTION

BETTER SELLING

MARKETING NEWS AND FEATURES

Plant Food Prescription Planning Pays Profits

By H. R. LATHROPE
Agronomist
Allied Chemical Corp.

How much plant food or how much fertilizer should I apply to my fields has been the question of thousands of farmers ever since soil testing began, back about 1912. Farmers get a soil test from a laboratory and someone makes them a recommendation for the amount of fertilizer and the kind to apply.

This idea would be more complete if the person who makes the recommendations knew exactly how many bushels of a particular crop or how many bales the farmers wished to grow. Most thinking farmers chuckle to themselves when they get a soil test recommendation of 100 to 200 or more pounds of a given formula to be applied to their fields when they know that the man who makes the recommendation knows nothing about the owners' desire to grow a given amount of crop yield. The whole procedure is as silly as a housewife attempting to bake a cake not knowing the size of the cake pan or the amount of cake that she may be required to make.

The plant food prescription plan takes into account the availability of plant food in the soils; the efficiency of fertilizer applied and the crop requirements are a recipe and further guide for the person making the fertilizer recommendation. It makes sense to the man who has the soil test and gets a recommendation from the laboratory. Crop yields are largely determined by the amount of plant food applied especially when the physical characteristics of the soil, temperature and moisture are adequate for the given yield.

The University of Wisconsin, about 1950, was confronted with requests by farmers for recommendations for alfalfa seeding which would guarantee a stand. Considerable work was done on this problem and a formula or recipe was agreed upon which, under average conditions, would guarantee a farmer a stand of alfalfa. Immediately this plan or method was transferred to the corn production program. Farmers were asking their soils department, headed by Prof. Emil Truog, to give them a recipe or to prescribe the amounts of plant food necessary to grow 100 bu. of corn. Several thousand farmers enrolled in what has been known as the Wisconsin Pacemaker Club. These men, desiring to apply enough fertilizer to get them 100 bu. of corn year after year, followed the advice of the soils department of the University of Wisconsin and each year for the past seven years have made their goal of 100 bu. of corn per acre or more.

The Wisconsin plan has been adopted by individual Pacemakers in all parts of Wisconsin, Minnesota, Illinois, Indiana, Iowa, Nebraska, Missouri, Ohio and Michigan and many other states.

These individual farmers are using the prescription plan devised by the University of Wisconsin because it works well and it is easy to follow. By following the plan, these farmers are making more money and building up their soils, instead of tearing them down. The program is simple. All that a man has to do is to find out how much plant food there is in his soil by getting a soil test—sending it to a reliable laboratory—and then determine how much plant food a 100 bu. crop of corn, for example, would remove from an acre. The difference is the amount that a farmer is required to apply or supply to the soil in order to produce the desired yield.

The efficiency of plant food is not 100%. Farmers must take into account the fact that plants cannot get all of the plant food out of the soil that is listed by the soil test or the soil technician—because the roots of the corn or the cotton, or other plant, do not touch all of the soil particles. The laboratory test is made to show the amount of plant food in the soil. Roots of corn plants touch only 5% to 10% of the soil particles in the root zone. Plant food such as nitrogen, phosphorus, potash and calcium do not mix in soils like sugar in coffee.

Soil scientists have determined that a corn crop, for example, can secure about 40% of the nitrogen, phosphorus and potash in the soil, as shown by soil tests. These scientists have also shown and determined that the applied plant food such as nitrogen, phosphorus and potash, calcium and other forms of plant food are much more available to the crop in many cases due to their applied locations than is the residual plant food.

For example, nitrogen is perhaps the most available of all the plant foods because it is possibly more mobile and farmers' crops usually get from 50% up to 75% of the nitrogen out of the soil when they apply this plant food correctly. Phosphorus is perhaps the least available and under the average conditions farmers' crops may get 25% to 40% of the material which they apply out of the soil, but in some cases they may not get more than 20% of the material taken up by a crop due to such factors as a low pH, improper placement of the material, or other conditions due to poor application, poor weather and climate. Potash perhaps is 50% to 60% efficient in its uptake by the corn plant. Potash is more mobile in the soil than is phosphorus.

Farmers, knowing that from applied fertilizer, their first corn crops can get from 60% to 70% of the nitrogen, 20% to 30% of the phosphorus, and about half of the potash, put them in good shape to determine how much material to apply.

The prescription plan takes into account the fact that the corn crop or any other crop cannot extract all of the fertility that is applied or that is residual in the soil. It is a simple matter to arrive at what a person needs to apply. It is almost like measuring the oil in the crankcase of a car and if one finds that it has only 2 qt. and that he needs 3 qt. to go 2,000 miles, then you need to add the necessary oil and always add enough so that you will have the required amount left when you get to your destination, allowing for the loss of oil out of the crankcase by fumes, evaporation or leakage.

Farmers today are spending more time determining the amounts of plant food that they should purchase and apply. Farmers are spending more time considering the types or forms of nitrogen, phosphorus, and potash. Time was when men used to apply 100 lb. of 2-12-6 to the acre for any crop and figured that the treatment was like putting oil on the hair

(Turn to PROFITS, page 14)

Timely Promotion Campaign Aids Texas Firm's Advanced Fertilizer Sales

By JESS BLAIR
Special Croplife Writer

Because the campaign was planned well in advance, the Farmer's Market & Elevator at Lamesa, Texas was selling enough fertilizer to cover 800 acres or more per week long before planting time.

"We knew that if we waited too long, most farmers might be too busy to use fertilizer," said Ward Franklin, one of the three owners, "so we started our promotion and advertising several weeks in advance."

The firm, owned by Mr. Franklin and his two partners, Gus Cowart and Lynn Batson, first set up a small soils laboratory in their store and asked farmers to bring in soil samples from their cotton fields. This analysis is a free service, so many farmers who had been paying one to two dollars per sample and waiting weeks for the results, flocked to the store.

"This gave us a chance to become better acquainted," said Mr. Franklin. "With each soil sample we could learn something about the owner, how he farmed and what his problems were. He would tell us what kind of fertilizer had been used previously and the results achieved. All this information enabled us to work with him."

The firm had already learned that to compete in the fertilizer business it must be able to do custom work. Many farmers in this irrigated belt have been fertilizing only three or four years. They do not yet know just what kind to apply or the proper amount to use. Few of them have their own spreaders.

"When you sell a farmer on fertilizer, you need to clinch the sale by providing the means to apply it," said Mr. Franklin. "So we added some extra units. Now we have five four-row spreaders, three of which we rent out, while the other two are used for custom work."

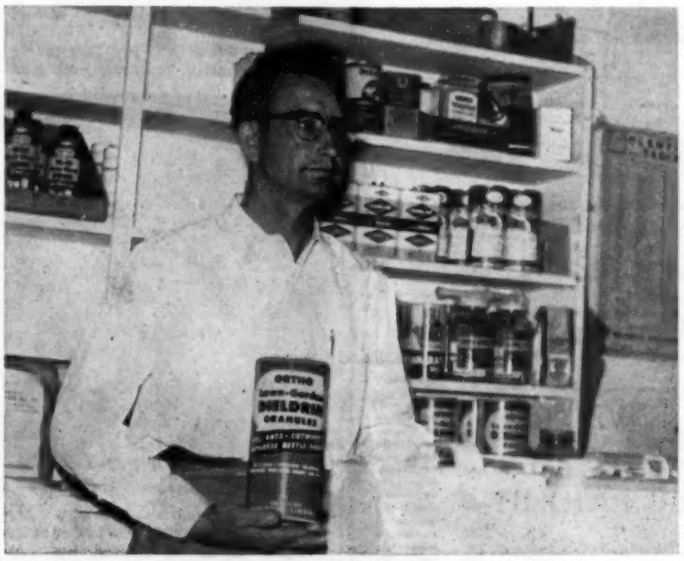
Farmers sign up for a spreader, indicating about what date they want it. They agree to pay $5 a day for its use and buy the materials from the Farmer's Market & Elevator. The company loads the spreader on a truck and carries it to the farm, then brings it back the same way.

"The units were kept busy every day after the season started," said Mr. Franklin. "Farmers wanted to avoid paying for an extra day, so the spreaders were kept moving. Meanwhile we kept our own two custom units busy also. For this work the price is figured in on the materials. We just about break even on our own work, and the profit is in the fertilizer sales alone."

The firm has 16 portable tanks for holding anhydrous ammonia, and these are loaned to farmers free of charge. Some farmers have their own applicators, so they also borrow the storage tanks.

All the spreaders are equipped to put out liquid and dry fertilizer at the same time. The pre-planting application usually consists of about 100 lb. of nitrogen and 60 lb. of phos-

(Turn to CAMPAIGN, page 13)



GARDEN fertilizer and allied items were a natural follow-up for the Farmer's Market & Elevator when selling field fertilizers. Ward Franklin, one of the firm's three young owners, is shown by one of the store's numerous displays.

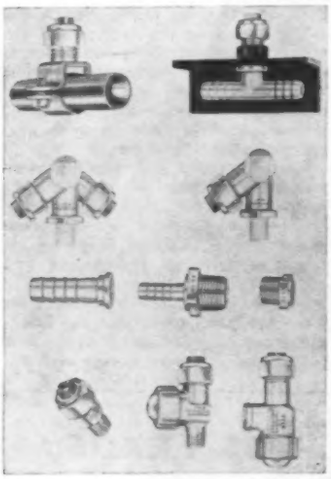
WHAT'S NEW

IN PRODUCTS · SERVICES · LITERATURE

To obtain more information about items mentioned in this department simply: (1) Clip out the entire coupon in the lower corner of this page. (2) Circle the numbers of the items of which you want more information. Fill in the name and address portions. (3) Fold the coupon double with the return address portion on the outside and fasten the edges with a staple, cellophane tape or glue. (4) Drop in the mail box.

No. 6062—Spray Nozzles

Spraying Systems Co. is offering a large selection in sizes and types of components of nozzles made of nylon. Tee-Jet spray nozzles with ¼ in. NPT male connection are available in a complete choice of flat, full cone or hollow cone orifice tip capacities,



the company says. All nozzle parts are made of nylon, with the interchangeable orifice tips in choice of stainless steel, aluminum or brass, and the strainer screens made of stainless steel. For complete information, a booklet can be obtained by checking No. 6062 on the coupon and mailing.

No. 6061—High Pressure Pumps

A Royalier series of high pressure pumps incorporating a principle to provide a pulsation-free stream of spray material has been introduced by John Bean Division of Food Machinery and Chemical Corp. The Royaliers are additions to the company's standard line of pumps. The line now includes 3, 5, 10, 15, 20, 25, 35 and 60 gal. a minute capacity models. The new pumps offered are the J-15 Royalier with 15 gpm capacity at pressures up to 400 lb. and the J-20 with 20 gpm capacity at up to 300 lb. pressure. The pumps are of fully enclosed construction with four corrosion and wear resistant sapphite cylinders, heavy-duty ball bearings and positive action, spring loaded stainless steel disc type valves, the company says. For details check No. 6061 on the coupon and mail.

No. 6063—Insecticide Information

Full details on the status of methoxychlor insecticide for use on forage crops and dairy cattle is contained on labels being made available by E. I. du Pont de Nemours & Co., Inc. According to the company, when used according to label recommendations, methoxychlor does not result in residues in milk, and therefore complies with the zero tolerance of methoxychlor in milk established by the Food & Drug Administration. For more information, check No. 6063 on the coupon and mail.

Also Available

The following items have appeared in previous issues of Croplife. They are reprinted to help keep dealers on the regional circulation plan informed of "What's New."

No. 6052—Tractor Mounted Sprayer

Hanson Equipment Co. announces a "Trak-Pak" sprayer unit that mounts on any standard three-point hydraulic hitch. The unit can be equipped with either a boom or

"Brodjet" sprayer. It is available with a choice of piston-type or nylon-roller-type pumps. Chemical particles are kept in suspension by a propeller-type mechanical agitator. A universal joint drive shaft from the tractor PTO powers the pump-agitator assembly. The 100 gal. fiberglass tank is completely inert to all agricultural chemicals and will not rust or corrode, the company says. A 14 in. top opening provides access to the tank interior. Chemical level is always visible on the gallonage gauge molded into the translucent tank wall. For complete information, check No. 6052 on the coupon and mail.

No. 6057—Fork Lift Booklet

The Model 530 Towmotor fork lift truck called the "Naro-Aisle-Stack" is described in an 18-page booklet released by Towmotor Corp. Illustrated are the truck's 180° pivoting action, plus its control features and com-

ponents. A typical space-saving situation, where 16 extra rows of storage space is gained, is covered, the company says. A method of power application for fork lift trucks, based on a principle of hydrostatics, is covered in detail. For copies, check No. 6057 on the coupon and mail.

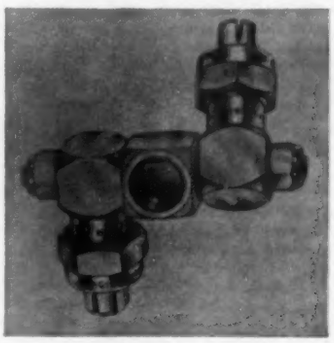
No. 6056—Improved Lawn Food

Swift & Co. announces greater coverage, higher nutrient content, ease of handling and a formula designed for grass in its 1960 line of Golden

Vigoro Lawn Food. It is now packed in 35 lb. bags, with a coverage of some 5,000 sq. ft., the company says. For more information, check No. 6056 on the coupon and mail.

No. 6051—Spray Nozzle

Delavan Manufacturing Co. has announced the development of a new spray nozzle. Called the Delavan BX, the tips are designed to offer additional coverage for spray booms at flow rates consistent with standard boom nozzles. They are available from 5 GPA through 10 GPA. Manufactured as both single and double nozzle, the BX offers additional coverage ranging from 68 in. to 104 in. for single nozzles and from 153 in.



to 194 in. for double nozzles when both are placed at 30 in. boom height, the company says. The single nozzle can be used for boom extensions or roadside spraying. A swivel nozzle mounting is recommended for easier adjustments. The double nozzles are well suited for small broadcast sprayers. For more information, check No. 6051 on the coupon and mail.

No. 6054—Sprayer Brochure

Hahn, Inc., announces the availability of a 16-page brochure and catalog on its 1960 line of Hi-Boy self-propelled high-clearance sprayers and accessories. The brochure illustrates uses of the sprayers for corn, cotton, tobacco and other crops. For copies, check No. 6054 on the coupon and mail.

No. 6060—Pallet Loading Machine

A pallet loading machine which permits high speed one-man loading of standard pallets for transporting by fork lift truck, has been announced by the Power-Curve Conveyor Co. The unit's powered turn-table station

Send me information on the items marked:

- ☐ No. 6050—Spraying Gauge
- ☐ No. 6051—Spray Nozzle
- ☐ No. 6052—Tractor Mounted Sprayer
- ☐ No. 6053—Spray Hose Data
- ☐ No. 6054—Sprayer Brochure
- ☐ No. 6055—Calendar Promotion
- ☐ No. 6056—Improved Lawn Food
- ☐ No. 6057—Fork Lift Booklet
- ☐ No. 6058—Insecticide Folder
- ☐ No. 6059—Crabgrass Control
- ☐ No. 6060—Pallet Loading Machine
- ☐ No. 6061—High Pressure Pumps
- ☐ No. 6062—Spray Nozzles
- ☐ No. 6063—Insecticide Information

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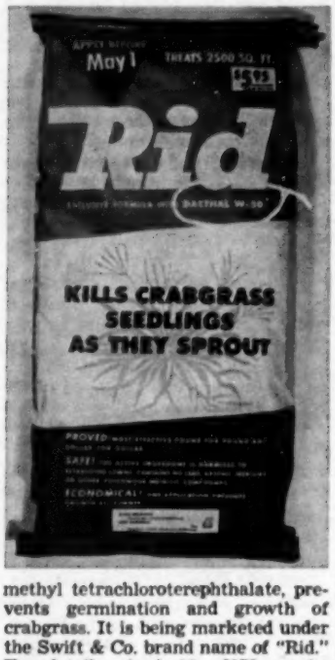
is used with a standard Power-Curve flexible loader and swivel stacker. Bags are power propelled into position on the pallet with the machine operator guiding each bag, using any palletizing pattern. When one pallet

is loaded, the turntable is rotated to position a new pallet while the loaded pallet is removed by fork lift. More than 1,000 bags an hour can be palletized by one man, the company says. For details, check No. 6060 on the coupon and mail.

No. 6059—Crabgrass Control

Discovery of a herbicide chemical that gives control of crabgrass and other noxious annual weeds, has been announced by Diamond Alkali Co. Called "Dacthal," the chemical di-



methyl tetrachloroterephthalate, prevents germination and growth of crabgrass. It is being marketed under the Swift & Co. brand name of "Rid." For details, check No. 6059 on the coupon and mail.

No. 6055—Calendar Promotion

Douglas Chemical Co. announces it has again prepared a two-year, color

calendar featuring pictures of the 12 most troublesome bugs with which grain storers have to contend. According to company literature, the calendar was so popular for the 1958-59 period, that it prompted reprinting it for the 1960-61 period. For copies, check No. 6055 on the coupon and mail.

No. 6058—Insecticide Folder

Pennsalt Chemicals Corp. announces the availability of a folder entitled "Control Aphids on Non-bearing Fruit Trees, Nursery Stock and Ornamentals." The folder describes Penco Ompa, a water soluble organic phosphate compound which contains 4 lb. octamethyl pyrophosphoramide per gallon for aphid control and mite suppression. How it works, advantages, how it is used and dilution table are included. For copies, check No. 6058 on the coupon and mail.

No. 6050—Spraying Gauge

A gauge, with direct reading in "gallons per acre" and designed to be mounted on crop spraying units, usually directly behind the tractor or jeep driver, has been announced by Mayrath, Inc. The gauge is for use with either 5 gal. or 8 gal. tips spaced 20 in. apart and gives gallons per acre of insecticide or weed killer being sprayed at speeds of three, four or five miles an hour, the company says. The gauge also shows pounds per square inch pressure, however, in

case the operator wants to use conventional charts. For more information, check No. 6050 on the coupon and mail.

No. 6053—Spray Hose Data

Literature covering the line of agricultural spray hose of the Swan Rubber Co. is available. Types of agricultural spray hose described in the new literature include low pressure, medium pressure, high pressure and hand spray. Information on applications, cover, reinforcement, tube, lengths, packaging and recommended couplings is outlined with each hose illustration. Special reference sections illustrating and describing various agricultural hose couplings plus the company's manufacturing facilities are included. For copies, check No. 6053 on the coupon and mail.

'HOPPER AREA NOTED

WINNIPEG—A slight reduction in severity and total area of grasshopper infestation is forecast for 1960 on the prairies. For the past two years outbreaks have been fairly serious. Light or moderate infestations are forecast for 78 townships in Manitoba, 797 in Saskatchewan and 295 in Alberta. Severe infestations are forecast for 38 townships in Saskatchewan. In Alberta the infested area is considerably larger than in 1958 or 1959.

Books on Pesticides

THE GARDENER'S BUG BOOK (1956)
Dr. Cynthia Westcott

The Complete Handbook of Garden Pests and their control. Information, scientifically accurate but easy to read on 1,100 insects, mites and other animal pests that attack trees, shrubs, vines, lawns, flowers, fruits and vegetables in home gardens. Illustrations in full color. Control measures combine the latest in chemical developments with time-honored cultural measures. Helpful to all who serve the general public and to truck farmers and fruit gardeners. 579 pages, cloth bound $7.50

HANDBOOK OF AGRICULTURAL CHEMICALS—Second Edition
Lester W. Hanna, Agricultural Enterprises, Forest Grove, Ore.

As the title implies, this book contains broad information and tables on not only the chemical products themselves, but also on toxicity, residues, registration, terminology and emergency treatments. A fold-out chart gives compatibility data on numerous materials for formulators. Information on fertilizers includes soil elements, trace minerals, and application techniques. Descriptive material is also presented on fumigants, fungicides, herbicides, systemics, growth modifiers, livestock chemicals, rodenticides, and antibiotics. Information on materials and techniques is written fully with illustrations and tables. 490 pages..... $5.95

INSECT PESTS OF FARM, GARDEN and ORCHARD—Fifth Edition (1956)
Leonard M. Peairs and Ralph H. Davidson

A standard text for 44 years. Includes insects affecting grasses, grains, cotton, legumes, vegetables, flowers, fruits, stored products, household goods and domestic animals. Contains a new chapter on insecticide formulations, spray mixtures, application equipment, etc. Material on forty new pest species added, including drastic changes in the illustration. 661 pages $8.50

DDT and NEWER PERSISTENT INSECTICIDES
T. F. West and G. A. Campbell

The first and major part of book is devoted to the physical and chemical properties, manufacture, formulation and applications of DDT. The second part deals with other chlorinated hydrocarbons whose insecticidal properties have been discovered recently and compares these new insecticides with DDT. The preparation of aqueous suspensions, solutions, emulsions, and dusts containing DDT, the compatability of DDT with other insecticides, fungicides and additions are covered in detail. Contains dozens of tables on the solubility of DDT in various solvents, the catalytic activity of accessory substances in the presence of DDT, analogues of DDT, the comparative toxicity, hydrolysis and solubility of DDT analogues, the toxicity of DDT for almost all important insects, etc. Many illustrations $8.50

PESTS OF STORED GRAIN AND GRAIN PRODUCTS
Richard T. Cotton, Stored Product Insect Section, U.S. Department of Agriculture, Washington, D.C.

Dr. Cotton's valuable book is full of practical up-to-date information on the problems of insect and rodent contamination. Some of the main topics covered are: methods of detecting contamination in cereal from rodents, birds and insects; prevention and control of insect infestation in grain; new methods of storage; methods of sanitation in grain storages and processing plants; the latest information on fumigation; heat sterilization; and protection of stored seed. This book is concise, readable, completely indexed and includes over 100 figures and illustrations. 306 pages, 6½x5½", photo offset, illustrated, cloth bound.... $4.00

METHODS OF TESTING CHEMICALS ON INSECTS—Vol. I
Harold H. Shepard, chief, Agricultural Chemicals Staff, Commodity Stabilization Service, U.S. Department of Agriculture, Washington, D.C.

This is Vol. I of a proposed three-volume study. It describes methods of studying the effects of chemicals on the physiology of insects. Also covered are general techniques for applying chemicals to insects. It includes laboratory screening methods for determining the killing efficiency of insecticidal sprays, dusts and fumigants. Its 14 chapters are authored by prominent entomologists from USDA and State Experiment Stations. 355 pages; 8½x5½" photo-offset, cloth bound $5.00

THE CHEMISTRY AND ACTION OF INSECTICIDES
Harold H. Shepard, Entomologist, U.S. Department of Agriculture, formerly Associate Professor of Insect Toxicology, Cornell University.

Treats the chemistry of insecticides, the history of their use, their commercial importance here and abroad, the nature of the major uses, the influence of environment on effectiveness. Materials are arranged according to their chemical relationships. Two chapters relating to organic compounds largely new as insecticides. Illustrative data in form of tables, and a convenient appendix of equivalents arranged for practical use in the field. 504 pages $10.50

ADVANCES IN PEST CONTROL RESEARCH—Vol. 2
Edited by R. L. Metcalf, University of California, Citrus Experiment Station, Riverside, Cal.

This book, an annual series, treats pest control as a distinct discipline, discussing chemical, physical and biological methods from the common viewpoint of the basic principles involved and applying them to the control of weeds, fungi, bacteria, insects—all organisms which compete with man for his food supply, damage his possessions, or attack his person. Each annual volume contains chapters contributed by outstanding scientists having intimate knowledge of various pertinent topics within the field, presenting not only comprehensive reviews of recent advances but also critical evaluation of new developments and concepts. This volume continues the same plan which won immediate acceptance for the series. In eight chapters, a group of experts present and interpret recent advances in subjects ranging from the innate toxicity of fungicides to isotope dilution techniques and the spread of insecticide resistance, 1958; 434 pages, 116 illustrations, 43 tables $12.50

INSECT, FUNGUS AND WEED CONTROL
Dr. E. R. de Ong

The information is grouped according to field of application rather than to chemical composition or nomenclature. Chapters on insecticide label, seed disinfectants, herbicides, forest insects and diseases, livestock insects, and the pests found in household and industry. Fumigation of warehouses, residual sprays and preservatives for fruits, vegetables and wood products are covered. An up-to-date guide on pest control with the needs of operators, agricultural and structural specialists carefully considered. Shippers and warehouse personnel will find the book useful $10.00

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FARM SERVICE DATA

EXTENSION SERVICE REPORTS

Announcement is made that deep placement of fertilizer increased yields of soybeans significantly over the normal placement during a three-year experiment at the Georgia experiment station.

A spokesman said the research, conducted by H. B. Harris, J. G. Futral, B. J. Johnson, and H. M. Fullilove III, showed that yield response to 500 lb. of 4-12-12 fertilizer was evident at all placement levels, and the response appeared to be increased as the depth of placement was increased.

Average yields for the three-year period were 14.9 bu. an acre for the 4 in. depth and 17.5 bu. for the 12 in. placement depth.

★

Georgia's master corn production program, off to a successful start in 32 demonstration counties, will need a "shot in the arm" in the next few weeks in the form of adequate nitrogen fertilizer, said J. R. Johnson, agronomy project leader for the University of Georgia extension service, recently.

Goal of the program, he pointed out, is to boost per acre yields of corn from 30 to 60 bu. Corn is Georgia's main grain crop and No. 1 crop in value. It is grown on about one-third of the state's cropland.

"Nitrogen sidedressing is an important step in producing highest possible yields at lowest possible costs," the agronomist said, explaining that corn plants use more nitrogen than any other element, and it is used throughout the growing season.

Greatest usage—about half—comes during a fast-growing period from about two weeks before until three weeks after tasseling.

"Some people look at growing corn when it is about knee high," Mr. Johnson said, "and because the plants look good they think the corn has enough nitrogen. Then, at the critical growth stage, the corn plant runs out of nitrogen."

To prevent plants from "running out of gas" the agronomist recommended adequate amounts of nitrogen sidedressing. Nitrogen, he said, will make ears out of "nubbins" and make two ears grow on stalks which otherwise would produce only one.

Some people use a rule of thumb measurement of 1½ lb. of nitrogen for each bushel of corn desired. To produce 60 bu. an acre, most Georgia farmers will need to use about 100 lb. of nitrogen sidedressing per acre.

"More Georgia farmers fail on this corn production step than any other," Mr. Johnson declared. "Yet, they've already spent money for land rent, labor, fertilizer at planting, seed and weed control. By using additional nitrogen they can step up yields and sharply reduce cost per bushel."

The master corn production program which the extension service is conducting with the cooperation of the Independent Plant Food Manufacturers Assn. includes six steps for boosting corn yields: (1) soil selection, (2) seed, (3) spacing, (4) fertilizer, (5) weed control and (6) sidedressing.

Georgia farmers produce only about one-half the corn used in the state. Last year 80,000,000 bu. were brought into the state at a cost of around $100,000,000. Major objective of the corn program is to double yields to meet this demand from livestock producers and feed mixers.

★

Dr. E. W. King, of the Entomology and Zoology Department of Clemson College, will attend the "Second International Congress of Bioclimatology and Biometeorology" to be held in London, England, this summer. Dr. King has been awarded a National Science Foundation grant to assist in defraying expenses at this meeting.

Dr. King is conducting research on the effect of weather on insect populations and activity. This research is aimed at determining insect population dynamics and the causes of outbreaks in order to develop sound bases for timing control measures. Connected with this research, Dr. King operates two modern recording weather stations and insect collection traps. One of these is located at the Pee Dee Experiment Station, Florence, and the other at Clemson.

★

Value of proper fertilization was clearly shown by results tabulated for the 1959 Pendleton Grain Growers fertilizer trial plots.

The trials revealed that fertilizer applied in wheat soil at the proper rates, and equally important, the proper balance of elements, gave net returns of over $30 per acre in some cases, while net returns from fertilization of green peas peaked at well over $80 per acre in one trial and over $30 in another.

Alfalfa grown near Ordnance, Ore., gave yield increases of over a ton per acre in three cuttings to produce excellent net returns from the proper use of fertilizer.

Irrigated corn for grain in the Stanfield-Hermiston area showed good response to fertilizer applications in both the yield and feeding value of the grain.

The necessity of balancing the soil's nitrogen supply to the available moisture is still shown to be No. 1, but this year's data points directly to the need for similar balancing of other plant foods. Sulfur and phosphorus are clearly shown to be limiting factors in crop production right along with nitrogen and moisture.

★

Basically, Georgia farmers need to use only three kinds of fertilizer to meet the needs of any soil fertility condition. These three are: (1) a fertilizer even in phosphate and potash such as 4-12-12; (2) a fertilizer high in phosphate and low in potash such as 6-12-6; and (3) a fertilizer low in phosphate and high in potash such as 5-10-15 or 0-10-20, says J. R. Johnson and P. J. Bergeaux, extension agronomists, University of Georgia.

Based upon the fertility condition of Georgia soils, what percentages of these three fertilizer ratios should Georgia farmers use and what are they currently using? In an attempt to answer these questions, soil test summaries for the past two years (1957-58) were studied by soil provinces. From the results of the soil test summaries, the percentage needs of the three basic fertilizer ratios were calculated. This was compared to the percentages that were actually used in 1958.

It is interesting to note the differences between north and south Georgia soils in phosphate and potash requirements. According to this survey, 27% of the soils in north Georgia require a fertilizer higher in phosphate than in potash, such as 6-12-6, while the Coastal Plain soils of south Georgia require only 2% of their fertilizer needs in this ratio. On the other hand, 70% of the fertilizer needs in south Georgia should be of a low phosphate—high potash fertilizer ratio, such as 5-10-15, while north Georgia soils require only 29% of their fertilizer needs in this ratio. This comparison illustrates the need of supplying the correct fertilizer ratio to farmers based upon the fertility conditions of the soils in that particular area. For instance, 70% of the soils in the Coastal Plains of South Georgia need a fertilizer higher in potash than phosphate (5-10-15), yet in 1958, only 13% of the fertilizer used in this area was of this ratio.

This information can be utilized by fertilizer manufactures as a basis for estimating the approximate percentages of the three basic fertilizer ratios (4-12-12, 6-12-6, 5-10-15) they need to base down for shipment to counties in a given soil province.

★

The application of even 40 lb. of available nitrogen per acre to mountain meadow annually will produce ½ ton per acre of additional hay, according to Dr. Elmer C. Hunter, Agricultural Research Service, U.S. Department of Agriculture, Ft. Collins, Colo.

"Production of hay is a major cost of ranching in the mountain meadow areas of Colorado, and the application of fertilizers will produce additional quantities of hay at less than market price," Dr. Hunter says, in a statement summarized by the National Plant Food Institute's western regional office.

Dr. Hunter goes on to say that high rates of nitrogen application—more than 320 lb. of nitrogen per acre—along with a two-cut harvest system, is one of the most profitable practices in producing hay containing a high percentage of protein, or superhay, as a supplement for weaner calves.

"This analysis does not take into account other benefits that might accrue to an increase in the quality or quantity of mountain meadow hay from fertilization," Dr. Hunter says. He enumerates these additional benefits: being able to increase the size of the herd and thus reduce the average cost of operation per cow-unit; an increase in animal weight from feeding the animals a better ration; reduction in use of summer range accompanying increased production from meadows.

In summarizing his analysis of management practices ranchers can employ to increase the quantity and improve the quality of hay from their mountain meadows economically, Dr. Hunter recommends:

1—The application of approximately 50 lb. of nitrogen fertilizer per acre.

2—The application of between 300 and 400 lb. of nitrogen fertilizer per acre to produce hay containing a high percentage of protein (at the most, one acre per 45 weaner calves would need to be so treated to provide a supplement for hay of low quality, that is, 6.5% crude protein, or less).

3—The seeding of adapted legumes periodically into the existing sod and the application of phosphate fertilizer on areas adapted to this practice.

Dr. Hunter was basing his recommendations on results obtained from a large number of fertilizer experiments conducted by Forrest Willhite and others of the USDA Agricultural Research Service in cooperation with Colorado ranchers.

Dr. Hunter's comments and much valuable fertilizer economics and management information are contained in the progress report, "Economics of Forage Production in the Mountain Meadow Areas of Colorado."

★

Phosphate fertilizer treatment on experimental alfalfa plots in Pershing, Churchill and Douglas counties produced additional profits of $34 per acre over an eight-year period, according to V. E. Spencer, Nevada Agricultural Experiment Station soils and plant nutritionist, Max C. Fleischmann College of Agriculture.

Another significant result of the work shows an increased life span of the alfalfa stand on plots receiving the phosphate treatment. Several of the plots have maintained high production levels through the past 10 years and still show good stands.

Mr. Spencer said that these stands with adequate top dressing would continue high production for some years, resulting in considerable savings in cost of plowing and reseeding operations.

The applications consisted of 500 lb. of triple superphosphate per acre disced and then plowed into the soil prior to seeding the alfalfa. This original treatment increased yield for a period of four to five years. At that time the plots were top dressed with 200 lb. of triple superphosphate per acre which boosted the yields for an additional two or three years.

The value of the increased hay production over the cost of the phosphate treatments for the eight-year period was $272 per acre, he said.

★

University of California scientists have stepped up the attack on weeds which cost state agriculture an estimated $300,000,000 a year.

Chester L. Foy, assistant botanist on the Davis campus, outlined to the recent 1960 California Weed Conference in Sacramento the basic objectives of a new three-point project being conducted under his direction.

Davis researchers will (1) develop, by chemical and cultural means, programs of weed control in the production of California's important field crops, (2) investigate the influence of environmental factors on the effectiveness of herbicides used on field crops, and (3) study the physiology and biochemistry of selective herbicidal action from a fundamental standpoint.

The specific goals of this project are the lowering of production costs, increasing yields, increasing the quality of field crop products, and reducing sanitation maintenance costs.

Mr. Foy reviewed progress since initiating the project in September, 1958. Results thus far have been most encouraging, he said. Several new herbicides, either inherently or by nature of use highly selective, have shown promise for controlling annual weeds in several California field crops.

The botanist disclosed that a number of new weed killers show promise of controlling weeds in small grain crops, small-seeded legumes, sugar beets, and corn.

For the first time, he said, two highly specific chemicals for the control of wild oats in barley and wheat are available for experiments.

FIRM OPENS

PHOENIX, ARIZ.—Farm Builders, Inc., to deal in soil conditioning, has been opened at 2505 East Thomas Road, Suite 8, with H. Jack Grocer as president.

CAMPAIGN

(Continued from page 9)

phorus an acre, then after crops are well started a side-dressing of about 40 lb. of nitrogen will be used.

"It takes a lot of selling to convince some farmers they need this much fertilizer," said Mr. Franklin. "So we figure out the cost of extra fertilizer and compare it with the extra half bale per acre they can make by using the proper amount."

Another obstacle was in getting winter fertilization started. Until a year or two ago most farmers were waiting until late to put down fertilizer. They were usually so busy with cultivation that they failed to apply it in time. Also by that time cropping expenses were running high and they sometimes did not want to spend the money for fertilizer, particularly if they had to borrow it, which was often the case.

"Our radio spot announcements helped a lot," explained Mr. Franklin. "We really pushed the soil testing program, using radio several times a day, as well as carrying large ads in the farm section of the daily newspaper."

The Farmer's Market & Elevator does more than just sell fertilizer. The three young owners have grain storage facilities and buy maize during season. They also have a seed cleaner which is kept busy several months a year.

In selling planting seed, they do not overlook the inoculants and other seed treatments. Still another source of revenue is catering to the town gardeners. They keep a stock of well known garden chemicals and sell quite a lot of dry fertilizer this way.

"A man should believe in what he sells," Mr. Franklin concluded. "We believe our products will make money for the farmer and we will not recommend the wrong kind or amount of fertilizer just to make a sale. We've all been farmers ourselves, so our desire to help them make more money must be evident to them. That may be one reason why we've been snowed under with orders ever since mid-winter."

Florida Spraymen Now Under New Control Law

TALLAHASSEE, FLA. — April 30 was the final day commercial spraymen could use toxic chemicals on lawns and shrubbery in residential areas without a permit.

A new law, requiring the licensing of all commercial spraymen in Florida, became effective May 1. The law provides full regulations for the use of toxic sprays, and requires that spraymen using these chemicals be acquainted with them.

Announcement was made that spraymen have been instructed to fill out and return to the State Board of Health forms sent to them in connection with the licensing program. The spray regulations were passed Feb. 9 at a meeting of the State Board of Health in Jacksonville.

Meanwhile, home owners may be next to be placed under the regulations and forbidden to use toxic insecticides without obtaining a permit and complying with safety precautions.

ONE THIRD INFESTED

OKLAHOMA CITY, OKLA.—Approximately one third of Oklahoma wheat fields are infested by green bugs and other aphids such as applegrain, corn leaf, spotted alfalfa and pea aphid, and also winter grain mites. Recent cold weather was reflected in an evident decrease in insects, particularly green bugs.

OSCAR & PAT

By AL P. NELSON

Oscar Schoenfeld was the type of methodical person who went to bed at nine thirty every night. As a result he usually woke up about 5 o'clock in the morning, very rested and ready for a day's work. This gave him ample time to shave, dress and have breakfast. Such early rising, too, also meant that Oscar had plenty of time to walk to work and still arrive at the farm supplies store fifteen minutes before seven.

On the way to work Oscar would self righteously look at the homes and yards of neighbors. When he saw lawn mowers left out over night, or garage doors open, or disorder anywhere, Oscar would click his tongue.

"Ach, how can people ever make things last, when they don't take care of their chobs?" he muttered. "Careless, ach, I can't standt that kind."

Arriving at the farm supplies store, silent at this time of the morning, Oscar inserted his key in the lock. The warm spring sunshine beat down upon him; the warm winds wafted about his head and nostrils; the robins twittered happily, and down in a nearby marsh the frogs croaked joyously.

But Oscar did not hear. He was concentrating. How many bills could he discount today? It was a passion with him.

Opening the door, he stepped into the salesroom. Then he drew up shortly.

"Himmel, was ist?" he stormed.

What he saw was a huge pile of bagged fertilizer right in the center of the store.

Oscar snorted with rage. "Who didt that?" he asked loudly and angrily. "The warehouse is the place for fertilizer. Pat didn't haul it in. He iss too lazy."

Belligerently he advanced toward the huge pile of crisscrossed bags of fertilizer. It was then that he saw some large signs stacked on one side. Evidently whoever had them made had not yet placed them atop the pile.

One sign said, "One Ton Fertilizer . . . Cash $74 . . ." Another sign said, "You Get Up to $3 Return for Every Dollar You Spend on Fertilizer . . . It's the Buy of the Year . . ."

His eyes glaring, Oscar read the signs. Another stated, "On Fertilized Corn Land Roots Go Down 7 Ft. as Against 5 Ft. on Unfertilized Land . . . Buy Fertilizer Now . . . Bag or Bulk . . . We Spread . . ."

At this moment, Tillie Mason, the plump, ulcerish bookkeeper came in, humming a tune. She wore a small bouquet of violets on her blue suit coat.

"Good morning, Oscar," she said cheerily, putting her black shiny pocketbook on her desk. "Isn't it a glorious morning?"

"Ach," said Oscar, "I don't notice the weather. Look at this! This is not wonderful!"

Tillie came over and looked at the big display of bagged fertilizer. "Well, for heaven's sake!" she exclaimed. "This wasn't here last night when I went home. Who did it?"

"I wouldt like to know, too," Oscar snapped. "Not McGillicuddy. That Irisher is too lazy to haul all those bags in here. And if he hired one of the men and paidt him overtime, he can take it oudt of his own pocket!"

"Hm, it isn't a bad idea," Tillie said thoughtfully, as she inspected the display and read the signs. "I'll bet it will put buying ideas in many farmers' minds. And look, Oscar, one sign stresses the cash price. Aren't you pleased?"

"I am not pleased!" Oscar snapped peevishly. "Why can't the fertilizer stay in the warehouse where it belongs? Why drag it in here? And cash—you know that Irisher will sell on credit just like a flash, if the farmer can't pay cash."

"Oh, Oscar, I hope you won't quarrel with Pat over this," Tillie pleaded. "It's such a wonderful day. Can't we have one day when you and Pat don't argue? Honestly, I am going to quit again if this keeps up. You two are fighting more every day, it seems."

"It's that Irisher's fault," complained Oscar. "He will neffer leave anything stay as it is for two days. Always he's got to be changink somethink or addink this or that. Ach, it will drive me crazy." He put his hand to his right side, then hurried to his desk. He took out a liver pill from a box and put it into his mouth.

"Guess I'll take an ulcer tablet, too," Tillie said dejectedly. "It looks like a rough day ahead. And it started out so beautifully."

For the next 10 minutes Oscar figured furiously at his desk. Then tall, hatless, bushy haired Pat McGillicuddy came in.

"Hi, Tillie," he said cheerily. Then he put his hand to his back. "Man, I'm sore. I'm not in shape to lift too many sacks of fertilizer."

At this, a tight lipped Oscar turned around. "So you did it," he said. "Ach, I wouldn't belief it. Did you have anybody help you?"

"No, I knew you'd object to overtime."

"I object to the whole crazy business," Oscar said. "Why brink the fertilizer in here? Why not leaf it oudt in the warehouse where it belongs?"

Pat sighed. "You don't get the point, Oscar. One ton of fertilizer displayed in here, with good signs, will sell more fertilizer for us than 50 tons hidden in the warehouse. Can't you understand?"

"No, I can't," roared Oscar, "but I can understandt somethink else. I have figured somethink. Our overdue accounts for 60 days run to about $20,000. That is aboudt 250 tons. Ach, maybe I shouldt haf our men display 250 tons—all bagged—in one big pile out in the parking lot andt haf a sign 'You Hooked Us for All This Fertilizer . . . Pay Now . . . Or We Addt 8%.' "

Pat was too shocked to answer. And so was Tillie.

Finally, Pat said, "Well, this certainly calls for a bracer. I think I'll go over to have some coffee at Happy's just to get a change of thoughts. If I don't, maybe they'll have to haul me away somewhere."

Maryland Agronomy Seniors Receive Awards

COLLEGE PARK, MD.—Two seniors in the University of Maryland College of Agriculture recently received agronomy awards.

John Schillinger, Severn, Md., was named recipient of the National Plant Food Institute Agronomy Achievement Award Scholarship of $200, according to Dr. A. M. Decker and Dr. J. R. Miller, faculty advisors for the Student Agronomy Club.

Dr. W. H. Garman, director of the Northeast Region, National Plant Food Institute, presented the cash scholarship to Mr. Schillinger along with a gold key. The institute has also provided a plaque for displaying a permanent record of the yearly winners of this honor. The National Plant Food Institute award is given to an outstanding junior or senior student in agronomy.

Raymond Murphy of Vienna, Md., received the American Society of Agronomy's "Outstanding Senior in Agronomy" award.

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PROFITS

(Continued from page 9)

and that a little would do the job. Little did they stop to realize that the 2 lb. of nitrogen in the 2-12-6 only gave them 32 oz. of nitrogen which is approximately 60% efficient, resulting in less than 20 oz. of the valuable material for the entire crop per acre. Mixing this 20 oz. of nitrogen with the top soil on an acre which weighs approximately two million pounds, is making a very, very weak application. Farmers used to apply this very weak application of nitrogen to their field and then plant 16,000 corn plants per acre and give each one a search warrant to go try to find its share of the 20 oz. In order to be more dramatic, one should divide the 20 oz. of nitrogen into 16,000 parts and then they would see the very, very small amount that each corn plant would have a chance to get.

But we have come a long way from the 100 lb. of 2-12-6 so that today men are applying 150 to 200 lb. of actual nitrogen per acre. Farmers have learned that the corn plant requires about 2 to 3 lb. of actual nitrogen to produce a bushel of corn. Figuring the losses, a farmer has to have 160 lb. of actual nitrogen in the soil for the corn crop to produce 100 bu. Sunlight is only 2% or 3% efficient. The gasoline used in motors is only 10% to 12% efficient and feeding corn to hogs is not 100% efficient. Crop producers have come to realize that nitrogen, phosphorus and potash when applied to the soil do their best job when enough is applied to give the crop all that it requires in line with other physical characteristics and the chemical, biological, entomological, genetic and ecological conditions which obtain in all fields.

For example, if a soil contains only 250 lb. of nitrogen, 75 lb. of phosphorus and 180 lb. of potash according to the soil test there would be approximately 100 lb. of nitrogen, 30 lb. of phosphorus and 72 lb. of potash which the plant could get. A farmer can readily see that he is short about 60 lb. of actual nitrogen and he can quickly figure out that he needs to add about 115 lb., 60% of which would give him about 60 lb. The same is true of phosphorus because the farmer realizes that he is short of 30 lb. of actual phosphorus and that he would have to add about 100 lb. so that he would make up for the inefficiency of this plant food. Potash is a little easier to figure because it is 50% efficient and the farmer knows that he is short about 50 lb. so he would have to add 100 lb. in order to make up the requirements of 160 lb. of nitrogen, 60 lb. phosphorus and 125 lb. of potash for a 100 bu. corn crop.

There are many factors, approximately 32 in all, which affect the yield of a crop and the nitrogen, phosphorus and potash applied are not the only things a farmer has to worry about, but when he does apply the necessary nitrogen, phosphorus and potash to produce the 100 bu. crop, he is more than likely to get what he plans for rather than trust to luck.

Good yields are usually planned. They just don't happen. The prescription method of planning plant food applications for each field is paying profits for everyone who tries it.

Thirty Alabama Counties Launch Fertility Demonstrations as Part of Soil Program

AUBURN, ALA.—Thirty Alabama counties have launched a soil fertility demonstration program as part of the 1960 Intensified Soil Fertility Program. The demonstrations with the major crops in each county will stress a complete crop production program starting with fertilizing for high yields as recommended by soil tests.

The counties participating are Lauderdale, Madison, Jackson, Franklin, Morgan, Marshall, Cullman, Cherokee, Walker, Pickens, Tuscaloosa, Shelby, Cleburne. Randolph, Clay, Hall, Perry, Fayette, Lamar, Pike, Bullock, Sumter, Chambers, Macon, Lee, Escambia, Coffee, Henry, Butler, Montgomery, and Chilton.

"Small one-twenty-fifth acre plots will be used on most of the demonstrations because they can be more carefully laid-out and supervised, better results can be obtained, there are better comparisons because soil variations are less than on big areas, and it will take less time, money, and fertilizer to get the job done," said J. C. Lowery, Auburn University extension agronomist. He also pointed out that the demonstrators will encourage the farmers to follow the recommendations on whole fields leaving out small check plots for comparisons.

The county agents and their assistants will conduct the demonstrations with the help of Mr. Lowery, Dr. Walter Sowell, extension soils management specialist, and E. K. Chandler, district representative of the National Plant Food Institute. The fertilizer is being donated in most cases by the local fertilizer dealers.

The demonstration sites are to be well marked with eye-catching metal signs along the roadside and the individual plots will be labeled according to treatment. Tours are planned when there are visual differences and records will be made of the results which are to be publicized in the newspapers, on the radio, and at farm meetings.

These demonstrations are the second phase of the Alabama Intensified Soil Fertility Program which emphasized the promotion of soil testing as the first step to increased farm profits in a number of counties last fall and winter. The object of the program is to raise farm income in Alabama by the profitable use of fertilizer and other recommended crop production practices. This work is supported in part by a grant from the National Plant Food Institute.

Guthion Registered For Use on Tobacco

KANSAS CITY—Chemagro Corp. here has announced that Guthion has been registered by the U.S. Department of Agriculture for use on tobacco. The chemical has been used extensively for controlling insects on deciduous fruits, cotton, nuts and certain vegetables, the company said.

Field tests conducted during the past several years indicate successful control of tobacco flea beetles, tobacco hornworms, budworms and aphids, Chemagro said. The chemical is available in both a 25% wettable powder and a spray concentrate formulation.

Calspray Appoints Field Agronomist

RICHMOND, CAL.—The appointment of Dr. Charles T. Lichy as field agronomist in the Fresno area of California Spray-Chemical Corp.'s western operations has been announced by George Wood, Calspray district manager. Dr. Lichy was formerly a research chemist for several nationwide firms based in St. Louis and will make his new home in Fresno.

Entomologists Urge 10-Point Insect Control Program

CLEMSON, S.C.—Insects destroy a considerable portion of the state's corn crop. But an adequate control program will help prevent much of this loss.

To help reduce loss by insects, W. C. Nettles, leader, Clemson Extension Entomology and Plant Disease Work, suggests the following 10-point control program for South Carolina.

1. Plant adapted recommended varieties—to reduce rice weevil and corn earworm damage to ears in field and storage.
2. Increase amount of fertilizer, use thick spacing, and plant on fertile soil.
3. Treat seed with DDT to prevent weevil damage to seed and to assure better stands. (A fungicide added to the treatment will also improve stands and vigor of seedlings.)
4. Turn land so that all stalks are buried to prevent emergence of larger cornstalk borer from overwintering quarters.
5. Rotate fields to reduce billbug infestations. Use substitute crops and make use of a 200-ft. grain barrier.
6. To control sand wireworm and at times other insects, such as seed corn maggot, use insecticide-seed treatments or insecticide-fertilizer mixtures. Aldrin fertilizer mixtures developed by the Pee Dee Experiment Station were tried by growers on over 23,000 acres last season. Rotation and substitute crops also help to control these insects.
7. To control chinch bugs, do not plant corn near fields of small grain, especially barley, wheat, or oats.
8. Turn under cover crops at least a month before planting corn to control seed corn maggots and rootworms. Keep grass out of growing crop to reduce attractiveness to earworms.
9. Plant corn at the right time. To plant too late invites damage from lesser cornstalk borer, fall armyworm, and corn earworm.
10. Watch out for cutworms. Apply insecticides to sod lands or where a heavy growth occurred the previous season.

Properly Used Pesticides Are Safe, Speaker Says

BURLINGTON, VT. — Pesticides have become a vital part of modern civilization, but they must be used as stated on the label, Dr. George B. MacCollom, Vermont Extension Service entomologist, said in an address at the 15th annual Farm Credit Conference held at the University of Vermont here.

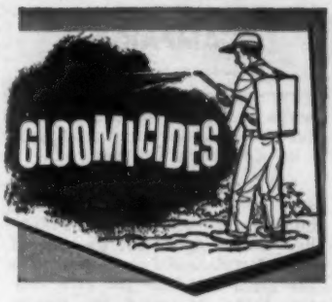
Speaking on the topic, "Preventing Milk Residues," Dr. MacCollom declared chemicals have boosted the production of some crops by 50% and are wiping out the danger of bacteria on a global scale.

Pointing out that manufacturers spend from $500,000 to $2,500,000 on each new chemical product, he concluded that "these facts, plus government standards, assure the safety of agricultural chemicals when used as directed."

NEMATODE GONE

TRENTON, N.J.—The twelfth annual New Jersey survey for the golden nematode, a microscopic eelworm that causes serious damage to white potatoes, has revealed no trace of the pest in the state, Frank A. Soraci, director, Division of Plant Industry, New Jersey Department of Agriculture, reports.

The search, conducted by the state and federal departments of agriculture, covered eight counties. About 2,400 samples, consisting of soil from potato fields and debris collected around potato graders, were taken.



"And this, I suppose, is one of those hideous caricatures you call modern art."

"Nope, that's just a mirror."

◆ ◆ ◆

A fellow who had had one too many was driving the wrong way on a one-way street and was hailed by a cop who rasped, "Hey, didn't you see the arrows?"

"Honest, offisher," gurgled the driver, "I did'n even see the Indians!"

◆ ◆ ◆

In a small town, the sheriff was also the vet. Late one night he received a frantic phone call, "Do you want me as sheriff or vet?" he asked.

"Both," came the reply, "We can't get our dog's mouth open . . . and there's a burglar in it!"

◆ ◆ ◆

Old Timer: My father was a great western politician in his day.

Friend: Yes? What did he run for?

Old Timer: The border.

◆ ◆ ◆

Man in restaurant to waiter: "What's the offense? We've been on bread and water for almost an hour."

◆ ◆ ◆

Announcement before a Trans-Atlantic jet flight: "Ladies and gentlemen, welcome aboard flight 702 . . . This is your captain speaking from the flight deck. We'll be cruising over the Pacific ocean at 35,000 feet this afternoon at an estimated ground speed of 730 miles an hour . . . We'll be carrying 144 passengers, 335,000 pounds of cargo . . .

"We'll take off as soon as I get up enough nerve!"

◆ ◆ ◆

The proud owner of a plant was showing his friend around.

"How many people work here?" the friend asked.

"I'd say about half," the owner replied.

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A violinist stopped in a London music store and asked for an E-string. Placing a large bunch of strings before the customer, the storekeeper remarked: "Ere they are, sir. Select what you want—I cawn't tell the 'e's from the she's."

◆ ◆ ◆

"Do you believe in heredity?" a reporter asked the son of a late lamented steel magnate.

"Most certainly," was the astonished reply. "That's how I came into my money."

◆ ◆ ◆

A clerk was handed a pay envelope which, by error, contained a blank check. The astonished clerk looked at it and moaned, "Just what I thought would happen. My deductions have at last caught up with my salary."

◆ ◆ ◆

He who has a thing to sell
And goes and whispers in a well,
Is not so apt to get the dollars
As he who climbs a tree and hollers.

Dealers Can Help Farmers to . . .

Fertilize Corn for Profitable Yields in 1960

By Dr. C. Loyal Swanson
Agronomist, Texaco, Inc.

PRODUCTIVE soil is the life blood of profitable corn production. But to be productive, the soil must be fertile.

Many soils were fertile when first broken by the plow. Years of cropping, however, have made these soils unproductive. For many of these soils, little thought or effort has been made in replacing the fertility removed by cropping.

Unproductive soils are unprofitable. Farming costs for these low-output soils are about the same as for productive soils. With low reserves of plant nutrients, low yields are the result and, hence, less income to offset production costs. The extra yields from soils high in fertility mean extra profits—and make farming pay.

The productivity of soils can be restored by application of fertilizers to make plant nutrients available for growing high yielding profitable crops.

If top corn yields are not being produced, the chances are the land is not producing the profit that it could. A fertilizing program that will give yields of 100 bu. an acre should be considered.

Perhaps more fertilizer is needed. A soil test would tell what the potential yields are for given fields. Have a goal set—and aim high—for top profitable production. Proper soil management along with fertilizers is essential for highest returns from fertilizers. The purpose of this article is to show how the most profitable corn may be grown on your customers' land.

Many Factors in Profitable Corn Production

Farming today has ceased to be a "way of life." It is a business requiring topnotch management. For maximum farm profits, all-around good farm management is essential.

Consideration of all factors bearing on corn production is absolutely necessary in order to "cash in" on the potential yield increase from fertilizer. High yields come from well-fed corn plants adapted to heavy stands. Other considerations for top yields include weed control, soil tilth, soil moisture, liming, the major, secondary and trace plant foods. In effect, good soil management must be practiced.

Corn in the crib will give an idea of what kind of a job the soil did last year. This corn can help the grower to plan a fertilizing program for the next growing season. The fertility status of soils is well expressed in the appearance of corn ears. The ears reflect whether the food supply was adequate or limited in some respect.

Well-filled normal ears of about a half pound each indicate that the corn plant received enough food during the growing season. The soil was well stocked with plant nutrients.

If most of the ears are very large, yields could likely be improved by using a thicker planting rate. If most of the ears are small, it's an indication of limited fertility, limited moisture, or too thick a stand.

Lime and Fertilizer

Obviously, in order to produce high yields, soils must be fertile. None of the plant nutrients should be limiting. The function of each plant food differs from the others. We can be sure that none of these plant foods are lacking, if we supply them as lime and fertilizers. Along with high fertility a good stand of corn is needed to take advantage of this fertility—as much as 16,000 to 20,000 plants per acre—plus adequate rainfall.

Lime is the work horse in the soil. It contains calcium and sometimes magnesium, both essential plant foods. It helps make fertilizers more effective by neutralizing soil acids. Thus sour soils are sweetened. Phosphorus is more available and soil bacteria grow better. Lime can be applied any time that spreading trucks will not damage soil tilth. Corn yields best at a pH of 6.5 to 6.8. For sour soils, liming is the first step in improving productivity.

Nitrogen is a growth promoting plant nutrient. It is essential throughout the growing season, especially during silking and tasseling. If cut short at a critical time, ears are small and sharply pinched off at the tip where pollinated kernels fail to fill. Corn uses larger amounts of nitrogen than any other plant food.

Phosphate stimulates early root formation and growth. Shortages interfere with ear development. Phosphate-starved ears are small and often twisted with part or entire rows of kernels missing. Kernel rows are often crooked and the ear tips not well filled.

Potash has a marked influence on the growth and development of leaves and stems. It improves the quality and weight of ears. Shortages show up in chaffy-like nubbins with dull-colored kernels. Kernels are loose on the cob and the ear tips are not filled. Corn that is short on potash may lodge badly.

Minor Elements are another group of plant foods needed for crop growth. They are becoming more important as larger corn yields are obtained. The chances are they won't need to be applied, but the grower should be on the lookout for deficiency signs. Iron and zinc deficiencies are limiting yields in some areas where the top soil has been removed.

Other minor elements are copper, boron, zinc, etc. Agricultural advisers can give valuable information on minor element needs.

Organic Matter Essential

Organic matter in the soil is essential for top corn yields. The soil is benefited in three ways—physically, chemically and biologically.

As organic matter decays, plant foods such as nitrogen, phosphorus, potassium, calcium and trace elements are released to plant roots. Soil bacteria use organic matter as an energy source for transforming fertilizer elements into soluble plant foods. The bacteria add life to the soil.

Organic matter improves soil tilth by sticking soil particles together into aggregates and crumbs, improving structure and aeration of the soil. Rains soak into these soils easier, and less soil is washed down the slope.

Organic matter should be added to soils at every opportunity, either by turning under crop residues such as corn stalks, small grain stubble, grass and legume sods, and green manures, or by applying animal manures for incorporation in the soil. Although crop residues and manure supply some plant nutrients, they do not supply them rapidly enough or in the correct proportions for top yields. Such materials must be supplemented with fertilizers if profitable yield increases are to be obtained.

Until recently, it was thought that continuous corn failed to keep up soil organic matter. However, agricultural experiment station research now shows that on deep dark-colored level soils not subject to erosion, with heavy fertilization, especially nitrogen, corn stalks turned under can supply as much organic matter as legumes.

Continuous corn has one advantage of supplying organic matter every year as a new supply of energy food for soil bacteria while usually a 3 or 4 year interval occurs with grass and legumes in rotations.

We now realize that legumes are not necessary to furnish organic matter to continuous corn soils. In many instances it is more efficient and economical to supply nitrogen as fertilizer to grow more of the organic matter.

For best land use, one should consider growing continuous corn on level land and rotation crops on rolling land subject to erosion. Soil conservation practices should always be applied in farming. These practices pay.

Learn All You Can About Soil

Know the soil. It is the source of wealth. The soil is the house and home of corn plant roots. With proper care a farm's soil will give a lifetime of profitable corn crops.

County extension agents or soil conservation technicians usually have soil maps and reports telling about the physical and chemical assets of soil that can't be seen nor detected by merely farming them.

A pertinent fact about soils is that no one can look at a soil or feel it and say a great deal about its fertility. Much can be said about its potential productivity, however, from visual observation.

A soil may be well drained and stone free with thick top, and still be poor in fertility. But the chemical or fertility status of a soil is not visible. It is best obtained by observing growing crops, from soil tests, and from plant tissue tests.

Sample Soil for Testing

This fertility inventory of soil is available through soil tests made by the agricultural colleges, county extension agents, or private soil testing laboratories. Instructions for taking soil samples are available for the asking from these people. Fertilizer dealers usually have copies available.

There's nothing complicated about taking a soil sample. The important thing to remember is that the sample should accurately represent the soil of the area being sampled. It should be remembered that the final spoonful or so of soil sample actually tested represents an area of land consisting of thousands of tons of soil.

If improperly-taken soil samples are submitted to the laboratory, poor results have to be expected. The best laboratory technique is not a substitute for carelessly taken samples. In fact, fertilizer recommendations based on tests from poorly taken samples may be misleading.

Samples can be taken at any time of year although sampling in the early fall has advantages: They are easier to take then; a fertilizer program can be planned for the next year; fertilizers may be plowed down that fall, and one can take advantage of discounts on fall-purchased fertilizers.

Soil tests help determine what fertilizer nutrients are needed and the amount of those nutrients needed for the crops being grown. One of the most important causes of poor results with fertilizers is failure to supply the proper balance of nutrients for a given situation.

Deficiency symptoms in the plant also indicate nutrient needs. A good soil test will indicate a need for the deficient nutrient long before the deficiency can be seen in the plants. When the deficiency is visually observed it is generally too late to do anything about it. This information, however, will be helpful in planning a fertilizing program for next year. Plant tissue tests will often indicate a deficiency long before visual deficiency symptoms appear.

Discuss Test Results

Soil test reports will contain recommendations on the lime and fertilizer needs for top corn yields. Urge the farmer to take time to discuss his report with an agricultural adviser or fertilizer dealer. It will pay dividends.

Agricultural advisers and fertilizer suppliers can help interpret the test results. The fertilizer recommendations should be adjusted to fit the farmer's resources and management program. Many Corn Belt agricultural experiment stations have prepared a generalized soil map and recommendations giving minimum average yield potentials for several crops, including corn. A study of these available facts usually means more dollars for you.

Fertilizer dealers can advise on details relative to the fertilizers recommended by the soil test report . . . grades, ratios, rates, kinds, costs, etc. Many have equipment for custom application of fertilizers if such is preferred.

Fertilize for Profit

How much fertilizer can be afforded? Economics is a part of every fertility program — farmers fertilize to make a profit.

A recent U.S. Department of Agriculture study shows that for the U.S. as a whole, $1 invested in fertilizer returned $3.06 in increased corn yields. For the Corn Belt this profit was $3.78 and for the Lake states $3.57.

One might also ask, "Can I afford not to fertilize?" considering the return per dollar invested in fertilizer. This USDA study also found that the maximum-profit fertilizer rate is reached when one additional dollar spent on fertilizer application will just add one dollar to returns. Situations and returns will vary from the average for individual farmers because of differences in climate, soils, costs, and management

How Much Carryover?

All of the plant nutrients are not used the first year. Part of them are used the first year in yield increases, but usually less than half is removed by the crop that is actually fertilized. Some may be lost by leaching, especially nitrogen, some is carried off by soil erosion or in runoff water, some may be changed into a form unavailable to plants which may be partly available later, and some remains in the soil in an available form which increases the yield. The carryover varies widely on different soils because of weather, kind of fertilizer, application rate, time and method of fertilizer application, yield increases, crops fertilized and soil management.

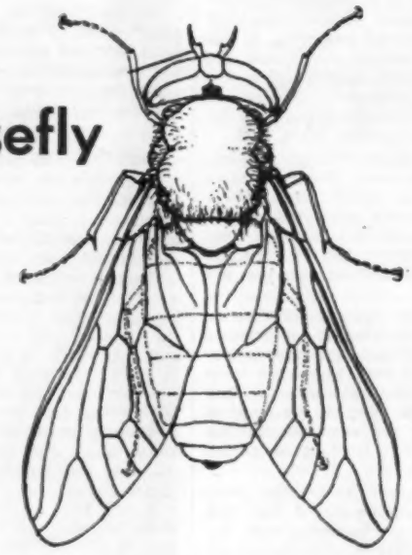
After a drouth, especially on the heavier textured soils, much of the nitrogen will be carried over to the next year. Not as much of it will be removed by the crop as when rainfall is plentiful. Because of the reduced rainfall, little of it will be leached from the soil. For example, in 1958 a 41% ammonium nitrate nitrogen solution was applied preplant to corn on Flanagan silt loam in research plots at the University of Illinois. No additional fertilizers were applied in 1959 as a check on residual effects, principally from nitrogen. The year 1959 was exceptionally drouthy, the rainfall averaging 5.07 in., less than

(Turn to FERTILIZE, page 17)

BUG OF THE WEEK

Mr. Dealer—Cut out this page for your bulletin board

Horsefly



How to Identify

Horseflies are usually quite large, which is their most obvious characteristic. There are several hundred species of horseflies in the United States. Such insects range in length from less than a half inch to a full inch.

Habits of Horseflies

Most of the horsefly species breed in moist places. Development from egg to adult may require only a few months or even as much as from one to two years, depending upon the species. In the maggot stage, the insect is a couple of inches long and in this form is pointed at each end. They spend the winter in this form, hibernating in the mud of rivers or lakes and even wet land areas. The flies begin to appear in early summer, soon lay their eggs on leaves of aquatic plants where the maggots may later fall into the water. Once in the water, the maggots sink to the bottom and burrow into the mud.

Damage Done by Horseflies

Although these insects will attack many types of warm blooded animals, they prefer horses and mules. They cause great annoyance to livestock and, more seriously, are carriers of diseases. Equine infectious anemia, or swamp fever, is thought to be carried by horseflies, as indicated by the fact that this disease reaches its height in the summer and by the persistence of the virus in the blood of infected hosts. Horseflies suck blood from the animals and cause acute physical discomfort to the animals in the process. The flies attack only in the daytime. Although horses and mules are targets of the major portion of their attacks, the horsefly causes economic damage on other domestic animals as well.

Control of Horsefly

Completely satisfactory methods of control of the horsefly have not yet been developed, but a number of chemical pesticides have proved effective. However, users must be particularly careful about application of toxicants in barns or other areas where residues could get on dairy animals and eventually into milk. Users should be urged to read all pesticide labels carefully and follow the directions exactly.

Drawing of horsefly furnished Croplife through courtesy of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

FERTILIZE

(Continued from page 15)

TABLE 1. Carryover Effects from Nitrogen Under Drouthy Conditions

Nitrogen Applied lb./A	— Yield, Bu./A — 1958	1959	—Increase Over Check, Bu./A— 1958	1959	Returns from N
None	79	60	0	0	0
30	101	66	22	6	28
90	114	70	35	10	45
270	116	84	37	24	61

half the normal of 10.96 in. for June, July and August. Table 1 gives the effect of residual nitrogen on corn yields during drouthy conditions.

Excellent Investment

Fertilizers, properly used, are one of the best investments a farmer can make at today's prices. Many farmers can earn as much as $5 on a dollar invested in fertilizer for six months to a year. With interest rates at 6% or more, such an investment would be profitable. These are summary statements included in a report on the "Profitable Use of Fertilizer in the Midwest" prepared by a Subcommittee on Economics of Fertilizer Use of the Corn Belt Agricultural Experiment Stations.

Profits can be increased substantially with top-level management plus good farming practices. According to data from Iowa State University, this may range from $14 to $22 per acre, depending on the amount of fertilizer applied, soil type, and management.

The highest yields given for each soil in Table 2 are those that Iowa State University believes that an average farmer, with top-level management, can average over a period of years. With top management, good practices and higher rates of fertilization, many farmers will be able to average above these yields. These data show that proper fertilization with other good practices pays off, year after year, on corn.

In the more favorable years, the good farmer can do considerably better than is shown in Table 2, if he will couple top management with adequate fertility. Table 3 illustrates what can be achieved. (Soil: Carrington loam.)

Thus an increased expenditure of $12/A for fertilizer plus top-level management netted $41. This compared with $22 net per acre with average management and average fertilizer applications.

Get Credit If Needed

Agricultural bankers fully understand the importance of fertilizers. Some banks hold meetings on fertilizers. Credit advances for fertilizer are available on a sound basis which include recommendations for fertilizers based on soil tests. A record of yield increases from fertilizer use in previous years is also helpful.

Fertilizers Can Be Applied Several Ways

Broadcast—Fertilizers can be applied either before or after plowing or disced in on plowed ground. Plowing down gets fertilizer deep and in the moist root zone. Disced in, the fertilizer might be unavailable in dry soil during the summer. This method of application tends to encourage weed growth and also the nutrients are more subject to removal by soil erosion.

Fall Application

Applying fertilizer in the fall has a number of advantages:

1. Soil samples are easier to take.
2. Discounts on fertilizers are usually available.
3. The farmer is assured of getting the kind and amount of fertilizers needed.
4. More time and labor are generally available to get the job done—spring work is not rushing.
5. Footing for applicating equipment is firm so there is less chance of damage to soil than in the spring.
6. Under most Corn Belt conditions, fall applications assure availability of adequate nitrogen and phosphorus for soil micro-organisms to break down plowed-under straw or corn stalks. Additional nitrogen must be applied when large amounts of straw or corn stalks are turned under to supply the needs of both the soil organisms and the plant.
7. Fall fertilizer applications plowed down often give better results than spring applications disced into plowed ground.

Fall fertilizer application is an excellent way of improving the general fertility status of soils. Built-up phosphate and potash can be applied at any time. The correct time to apply nitrogen fertilizers in the fall depends on soil temperature and texture. Nitrogen applications should not be made until the soil temperature reaches 50° F. in most of the Corn Belt; on sandy soils and on all well-drained soils in the southeastern part of the Corn Belt, applications should be delayed until spring. Leaching may move nitrate forms of nitrogen below the root zone. Ammonium nitrogen will leach less than nitrate nitrogen.

Starter Fertilizer — Using starter fertilizer in the row at planting time is essential to get corn off to an early start. Early growth is greater than when all the fertilizer is applied broadcast. Starter fertilizers are especially desirable on the more slowly drained, level soils which tend to remain cool and wet until late spring. Under these conditions, the readily available fertilizer nutrients promote continuous, rapid, early growth during a time when the availability of soil nutrients may be quite low.

Higher rates of starter fertilizer can be safely applied in the row if placed 2 in. to the side and 1 or 2 in. below the corn seed. Under no condition should the starter fertilizer be placed in contact with the seed.

The common split boot attachments scatter the fertilizer with the seed so no more than 30 lb. of actual nitrogen and potash per acre should be applied. Heavier applications may reduce germination.

Other advantages of properly placed starter fertilizer include the following:

1. Phosphate is more available to plant roots; less is fixed by the soil.
2. Plant food is within easy reach of plant roots yet not in a concentration which is injurious to them.
3. Fertilizers in bands along the row do not readily furnish nutrients to weeds growing between the rows.

Use of low-nitrogen, high-phosphorus mixed fertilizer will provide at least 30 lbs. P_2O_5 in the row. Nitrogen in association with phosphorus seems to stimulate roots to absorb phosphorus. Depending on the soil tests and soil type, the ideal ratio of nitrogen to phosphate to potash is about 1:4:0, 1:4:2:, or 1:4:4. Evidence is piling up that as more nitrogen is being used in the fertilizer program, more potash is needed. Thus, the trend is toward a 1:4:4 if the potash test is low, or a 1:4:2 if it is high.

These amounts of starter fertilizer will give the corn a fast start. Then the plowed-down fertilizer will take over to produce high yields.

Side placement attachments for corn planters for either liquid or solid fertilizers are available at most implement dealers.

Sidedressing — Nitrogen fertilizer may be sidedressed either preplant or after planting, or before the corn is knee-high. In most cases nitrogen sidedressed in a band is not leached and can be applied early enough to avoid root injury. Late applications iniected into the soil may prune the roots.

More Nitrogen Needed

When the soil has been brought to a high fertility level, the yields are related primarily to nitrogen. Nitrogen will provide that "push" needed for extra bushels for high yields. Nitrogen, of course, is effective on nitrogen-deficient soils, but it is most effective on soils in a high state of fertility.

An idea of how much nitrogen is needed for extra bushels may be gained by making some simple calculations. All soils release some nitrogen depending on their texture and organic matter content. But the corn has been using this nitrogen plus any released from manure and crop residue plowed down. Thus the farmer should:

take the present yield without fertilizers and subtract that from the desired yield; then multiply the difference by a figure ranging from 2 to 3. (It takes from 2 to 3 or more pounds of nitrogen to produce a bushel of corn.)

Sandy soils will usually require more nitrogen than heavy soils. Likewise, soil low in fertility will need more nitrogen than those high in fertility.

Example:

	Bu. per acre
Desired yield	120
Present yield	80
Yield increase	40

Silt loam soil medium in fertility: factor of 2.5 x 40—100 lb. of nitrogen required to apply to produce 120 bu. of corn.

If higher yields are desired, the factor is increased. For continuous corn after the program is started, some use 1 lb. of nitrogen per bushel of corn, or 120 lbs. for a 120 bu. yield. The nitrogen in the fertilizer applied broadcast, and the amount in the starter, must be taken into account and the rest applied by sidedressing.

Kinds of Nitrogen

Nitrogen fertilizers are available in gaseous, liquid and solid forms. Anhydrous ammonia is the gas, nitrogen solutions the liquid, and urea, ammonium nitrate, ammonium sulfate the principal solid forms. All of these nitrogen materials are used in manufacturing mixed commercial fertilizers such as 12-12-12, 9-9-9, 15-5-5, 6-18-6, 4-24-12, 5-20-20, 8-16-16, 8-32-0, 10-20-0, 15-15-0 and other grades.

Choice of nitrogen fertilizers to apply will depend on their cost, availability, labor involved in application, and convenience of custom application, soils on the farm, fertilizer application equipment on the farm, time of year and other factors inherent to the profitable operation and management of the farm.

Generally, the higher the nitrogen content of the fertilizer, the less the cost of a pound of nitrogen. This is particularly true for the straight nitrogen materials. The nitrogen content of these are as follows:

Fertilizer	% N
Anhydrous ammonia	82
Nitrogen solutions	21–49
Urea	45
Ammonium nitrate	33
Ammonium sulphate	21

Nitrogen in commercial fertilizers occurs in the ammonia, urea, or nitrate forms of nitrogen. Some contain all three forms, such as some of the nitrogen solutions. Pound for pound of nitrogen, all are equally effective as nitrogen fertilizers in increasing corn yields. They may vary in their reaction in the soil and in their subsequent availability, as for example, in the non-leaching qualities of anhydrous ammonia.

Because soils vary in their ability to retain nitrogen from leaching, consideration should be given to the kind of soil on the farm and the time of year the nitrogen is applied. Ammonia is retained by soils best, urea next, and nitrate is readily leached. Ammonia is held more tightly by soil clays and must be changed to nitrates by soil bacteria before corn roots will readily use it. If the soils

TABLE 2. Dollar Returns from Fertilizer and Good Farming Practices on Corn Land in Iowa

Soil Type	Nicollet Loam		Carrington Loam	
Yield, Bu/A	78	52	75	42
Costs*				
Labor	$ 9	$ 8	$ 9	$ 8
Machinery	14	13	14	13
Seed	2	2	2	2
FERTILIZER	13	4	12	4
Other	5	4	5	4
Total	$43	$31	$42	$31
Returns @ $1/bu	$78	$52	$75	$42
Production cost	43	31	42	31
Net/A	$35	$21	$33	$11
Increased net/A due to fertilizer and management		$14		$22

*Land charges are not included. Prepared by the National Plant Food Institute.

Table 3. Dollar Returns from Corn Production with Top-Level Management, Use of Recommended Practices Plus Adequate Rainfall

Fertilizer Applied	— Adequate —	— Low —
Yields, Bu/A	126	67
Costs*		
Labor	$10	$ 8
Machinery	15	13
Seed	2	2
FERTILIZER	15	3
Other	6	4
Total	$48	$30
Returns @ $1/bu	$126	$67
Production costs	48	30
Net/A	$ 78	$37
Increased net/A due to fertilizer and management		$41

*Land charges are not included. Prepared by the National Plant Food Institute.

are sandy, the ammonia form will probably be best since it will not leach readily.

Ammonia and urea nitrogen fertilizers are recommended by the agricultural experiment stations for fall-applied nitrogen. At 40° F. or less, they will not be nitrified to nitrates.

In the spring, almost any form of nitrogen can be safely applied. About as fast as the nitrates are available, corn roots will absorb them from the soil. An exception would be on sandy soils. Here one application might be applied as preplant and one or more as sidedress.

If spring rains are unusually heavy, it may be necessary to sidedress an extra time to replenish the nitrogen lost by leaching.

Applying Nitrogen

Nitrogen may be applied in several ways and at several times of the year. As has been pointed out, nitrogen is contained in mixed fertilizers, and some is applied when mixed fertilizers are broadcast, disced in or plowed down, and in starter fertilizers.

Anhydrous ammonia can be applied in the fall and in the spring as preplant and sidedress. It can be applied before, during, or after plowing. If applied after planting, apply midway between the corn rows about 5 to 8 in. deep. Apply early to avoid root pruning, preferably before corn is 12 in. high.

Nitrogen solutions may likewise be applied either in the fall and plowed down, or in the spring as plow down, preplant or sidedress. Non-pressure solutions may be applied on the soil surface. Pressure solutions must be injected into the soil several inches. When applied in the row, root pruning should be avoided.

Straight nitrogen solid materials such as urea and ammonium nitrate may be broadcast, disced in or plowed down, either in the fall, or in the spring as preplant. When sidedressed early, the application should be about 8 in. to side of the row. Applications made not later than first cultivation will avoid root pruning.

Additional nitrogen should be applied when corn stalks, heavy straw, or other carbonaceous material is plowed under. These residues contain little nitrogen. The added nitrogen will aid decomposition of the material preventing severe nitrogen deficiency of the corn. The soil bacteria will rob the corn if enough is not available for both the bacteria and corn plant. Nitrogen fertilizers may be applied broadcast on these materials or injected into the soil prior to plow down.

Fertilizers Not All

If goals are to be realized, other important production management aspects must be considered.

Low plant population cannot take advantage of highly fertile soil. High plant populations plus fertilizers mean increased yields.

For highest yields, plant population at harvest should be between 16,000 and 20,000 stalks per acre. A stand loss of about 15% is expected, so from 18,000 to 23,000 should be planted to get the population wanted at harvest. Corn planter instruction books tell how to set planters for these populations, either hill dropped or drilled.

Planting should be done at a low speed. A half-day or a day extra spent planting will be a good investment.

Some hybrids do poorly at high population rates. Some are not adapted to highly fertile soils. Use only the hybrid adapted to the environment of the planting area.

Practice minimum tillage. The soil should not be overworked. Work the soil the least number of times consistent with proper seed bed preparation and weed control. Every trip over the field not only costs money, decreasing net profit, but also compacts the soil further, decreasing available root space.

Herbicides should be considered to eliminate cultivations. If weeds are killed early when they are small, the corn will shade them out later. Don't cultivate deep and prune roots, especially after first cultivation.

Irrigation should be done during dry seasons if water is available. In the Corn Belt, in certain areas, a considerable amount of the corn is irrigated. Since nitrogen is water-soluble, it can be applied in the irrigation water. Even if irrigation is not available, fertilized corn will make more efficient use of the water that is available to it. Larger yields will come from fertilizer on corn even in dry years.

Control insects. Insecticides must be applied for control of soil insects (wireworms, grubs, and root worms) at recommended rates, either broadcast or in the starter fertilizer, especially for corn following corn or after sod. When fertilizer is placed about 2 in. deep and to one side of the row only, an insecticide applicator is used to place granules with the seed.

For cutworm control the insecticide is applied as a spray over the corn row.

If corn borers are prevalent insecticides must be put on in time to kill the young borers. More borers will be present if the crop is planted early. Timing of treatments is important.

Look for Limiting Factors

The farmer should walk through his corn fields several times during the growing season, especially in late summer and early fall, to look for "trouble signs." He should start when corn is between knee-and-hip-high, first count the stalks. Stalks per 131 ft. of 40-in. row times 100 equals number of plants per acre.

The farmer should be thorough in checking for these "trouble" signs. He should observe first the general appearance of a normal healthy field and inspect leaves, stalks and roots carefully.

Is some of the corn yellowish-green, stunted, reddish-purple, or the stalks broken? What caused these abnormalities?

If the soil is short of nutrients, the corn usually will show signs on the leaves and stalks.

Are the roots pruned? Probably cultivated too close and deep. Stalks should be opened to check on corn-borer damage or disease, and ears inspected at harvest time to see if they are poorly filled, twisted and very short. Barren stalks constitute another sign of limiting factors which should be corrected to assure more and better corn next year.

Well Fed Corn Is Easy to Tell

Healthy leaves shine with a rich dark green. Well-nourished plants present a mass of dark green foliage with little opportunity for light to penetrate to the soil below. The corn is tall and the stalks sturdy and strong. The ears are medium-long and develop early. Corn that fits in this kind of a picture must have a population of 16,000 to 20,000 plants per acre with no fertilizer nutrient a limiting factor.

Many times nitrogen deficiency will not show up acutely on the leaves on nitrogen-short plants until toward the end of the growing season. The corn appears healthy but on closer examination, one sees that sunlight easily penetrates to the ground through the relatively sparse foliage and medium-thick shorter stalks. The leaves are off-color—not a rich dark green. Later, one can see that the ears are shorter and the tips not filled. The silks are greener and slower in maturing. Other limiting or near limiting fertilizer nutrients may be contributing to this deceptive healthy growth.

By this time, however, it is too late to apply nitrogen. The corn has run out of it. The critical time of nitrogen need is when the corn is silking and tasseling when it needs as much as 3 lb. of nitrogen per day. The damage has been done—but these signs of nitrogen hidden hunger should help the farmer next year in planning his fertilizer program. Corn must be watched closely earlier in its growth, for if deficiency signs show up before the corn gets knee-high, nitrogen can be sidedressed and the deficiency corrected.

TABLE 4. Correcting Moisture in Ear Corn to Shelled Corn Basis (No. 2 corn—15.5% moisture content)

Moisture* %	Correction %	Moisture %	Correction %	Moisture %	Correction %
13.0	+3.0	17.0	—1.8	21.0	— 6.5
13.5	+2.4	17.5	—2.4	22.0	— 7.7
14.0	+1.8	18.0	—3.0	23.0	— 8.9
14.5	+1.2	18.5	—3.6	24.0	—10.1
15.0	+0.6	19.0	—4.1	25.5	—11.8
15.5	0.0	19.5	—4.7	30.5	—17.8
16.0	—0.6	20.0	—5.3	35.5	—23.7
16.5	—1.2	20.5	—5.9	40.5	—29.6

*If corn contains more than 15.5% moisture, subtract from your harvest yield—the percentage correction times bushels yield; if less than 15.5% moisture, add the correction. Example: Uncorrected harvest yield is 130 bu. with 24% moisture. From the table, the percentage correction is 10.1. Multiply 130 x 10.1=13. Subtract 13 from 130 or a corrected yield on No. 2 corn basis of 117 bu. per acre.

Visual Deficiency Symptoms

Nutrient deficiencies show up in corn plants in a familiar but costly pattern. The deficiencies are not visible until the damage is done. When they can be recognized, it is too late. In years past, if discolorations have been noted in the corn, a heavy penalty in reduced yields and quality has been paid.

Nitrogen hunger signs in the leaf show yellowing at the tip, then running along the midrib while the edges stay green, starting with the lower leaves.

This drying of the leaf should not be confused with drouth. Drouth is often blamed for the "firing" of corn. Nitrogen is often used up about the time that drouth occurs. Dry weather causes the corn leaf to have a grayish-green color and to roll up to about the size of a lead pencil.

High nitrogen applications are not the cause of lodging on soils high in fertility. Lodging may increase with more plants per acre, but this probably is due to lodging tendencies of some corn varieties.

Phosphate shortage causes general stunting of early growth when corn plants have critical need for phosphate and their root systems are small. The lower leaves turn reddish purple on the tip and edges; severe hunger turns the whole leaf. Phosphate also controls stalk size and ear set. Weak, spindly stalks, either barren or with small, twisted ears are a good indication of phosphate shortage.

In potash hunger, marginal burning of lower leaves and shortened stalks are the distinguishing marks of deficiency. The yellowing starts at the tip and runs along the leaf edge, turning brown, dying, and breaking out to look ragged. Potash produces stiffer stalks and corn short on potash will lodge badly.

Magnesium deficiency is not as common as the major nutrients but sometimes does occur as whitish strips along the veins with often a purplish color on the underside of the lower leaves.

Minor Elements. Visual symptoms are more difficult to recognize. Probably only iron, zinc and copper (muck) may appear in the Corn Belt. Boron deficiency has resulted in barren stalks in a limited area. It is best to have an agricultural adviser with considerable experience in recognizing minor element deficiencies check the field if such a lack is suspected.

Plant Tissue Tests

Tissue tests are another way to check on the nutritional status of growing corn. With this test deficiencies may be found before starvation signs occur. The plant sap is tested to indicate present supplies of reserve nitrogen, phosphorus and potash in the plant. When used properly, tissue testing can be helpful in finding deficiencies but it is usually too late to correct them. The plants are too large for supplemental fertilizer applications, except possibly for nitrogen sidedressings.

Considerable experience is needed to interpret tissue tests but the only way to get experience is to make the tests. A better understanding of future fertilizer programs is obtained. Tissue testing will not eliminate the need for soil testing. The use of both tests will give a better understanding of soil problems.

Field Check Yields

It's easy for the farmer to check his own yields. It is really the only way he can be sure. Yield is an important measure of management and achievement.

He should leave a check strip of eight or more rows when applying fertilizers, avoid dead furrows and the edge of the field, and compare this at harvest with the fertilized corn.

The best method is to harvest by hand picking 1/100 of an acre. (This is 131 ft. of 40-in. spaced rows.) For convenience, harvest 65.5 ft. of two adjacent rows. In the check strip, harvest the two inside rows of the eight row strip, the two outer rows serving as guard rows against overspreading of fertilizers into the test strip. Harvest the check strip and the fertilized area in four places along the row length.

This will iron out soil differences and obtain the best average yield. Be sure that the check strip and fertilized area are similar soils, for comparisons will not be valid if the soils are markedly different.

Before beginning to harvest, one must count the stalks, ears, and barren stalks. Stalks counted times 100 equals stalks on a per acre basis, or plant population rate. The lodged stalks may be counted.

Each yield from each 131 ft. of row is weighed separately with a milk scale or other suitable scale. The weight of the corn divided by 70 (pounds per bushel of ear corn) times 100 gives bushels per acre yield for one harvested strip. Calculate average yield for the four strips harvested.

This yield is not corrected for moisture. This correction can be made by shelling 2 or 3 kernel rows full length from about 6-10 ears taken at random from each row strip harvested.

Shell off the corn, place it in air-tight container, and have moisture content of corn determined at the local grain elevator. Determine the yield corrections for moisture from the table. If the corn is over 15.5% in moisture, subtract the correction; if less than 15.5%, add the correction.

Two or more rows may be machine-picked instead of 1/100 acre hand-picked. The weight of the corn harvested from two or more rows must be corrected to a per-acre basis as well as corrected for moisture.

Protein Increase

Nitrogen applications generally increase the protein content of corn, thus increasing its feeding value. Protein analyses can be made on the samples used for moisture analyses. A protein analysis will tell how much the quality of corn was improved by nitrogen fertilization. Several commercial laboratories will run protein analyses at nominal charge.

Beginning June 6, 1960, Croplife will be issued every other week . . .

Mailing Schedule

Production Edition	Marketing Edition
June 6	
	June 20
July 4	
	July 18
Aug. 1	
	Aug. 15
Aug. 29	
	Sept. 12
Sept. 26	
	Oct. 10
Oct. 24	
	Nov. 7
Nov. 21	
	Dec. 5
Dec. 19	

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VIEW

(Continued from page 1)

manufacture and store energy in a wide variety of chemicals—starches, sugars, fats, oils, proteins, vitamins, enzymes, hormones and so on ad infinitum.

Then through the complicated processes of digestion, assimilation, and metabolism, farm animals, like the chemist in his laboratory, react these compounds with others to release stored energy for work and to form still other complicated organic chemicals, some of which are so complex man has not yet been able to identify, let alone duplicate, them.

If the Creator of the universe and all plant and animal life saw fit to make physics and chemistry essential components of the natural law, why should the use of chemicals by man be considered reprehensible? As a matter of fact, it is not. One simple fact seems clear—the agricultural production and the standard of living in the various nations of the world are proportionate to their knowledge of and their use of chemicals in agriculture.

It seems probable man's first knowledge of chemistry had something to do with the properties and use of water, one of the simplest of all chemicals, a basic component in many chemical reactions, and utterly essential to the growth of plants and the survival of man and beast.

His second venture in chemistry may have involved oxidation reactions—in other words, the use of fire to produce heat or energy. Perhaps fermentation and the making of ciders, mild acids, wines, brandied fruits, kraut, etc., came next. The exact sequence in which various classes of chemicals and chemical reactions came into use in primitive agriculture is not important here. However, we should realize that the use of chemicals is not new to agriculture and that the American farmer of today uses chemicals in almost every phase of his operations.

As a matter of fact, certain classes of chemical products have become so generally accepted that the average person no longer thinks of them as specific chemicals and combinations of chemicals. For example, thousands of tons of fertilizers involving literally hundreds of combinations of so-called essential elements and their related salt radicals plus a variety of minerals and trace elements are used each year.

Then, too, agriculture is reportedly the largest single industrial user of petroleum products. Gasoline, diesel fuel, lubricating oils and greases are regarded as indispensable on practically every farm. We must note, also, that wood preservative chemicals, paints, explosives, drugs and several other miscellaneous chemicals are in common use.

The feeding of domestic animals was once a very simple procedure. You merely gave them so much hay, silage, straw and/or grain with little or no thought as to their chemical composition. Today it is different. Now that committees of experts, working under the auspices of the Agricultural Board of the National Research Council, have prepared and published bulletins setting forth the nutritional requirements for the various classes of livestock, animals on the better managed farms receive diets that are carefully balanced on the basis of the nutritive value and the chemical composition of the ingredients.

As a matter of fact, competition in livestock feeding has become so great and the margin of profit so small, it has become a common practice to use feed adjuvants that enable animals to increase their efficiency in the digestion and assimilation of feed and thus give greater gains per unit of feed—in fact, such a practice is a must for those who hope to stay in the business.

In recent years another great class of chemicals, the so-called agricultural chemicals, or pesticides and related materials, has played a major role in reducing prohibitive labor costs and in the attainment of greater efficiency in agriculture. As you are all no doubt aware, in recent years this group of chemicals has been subjected to much criticism from many sources. Thus, it is upon this group that we will concentrate our attention at this time.

The average citizen takes our American standard of living, including a bountiful food supply, more or less for granted. Therefore, a brief review of the nature and magnitude of the activities of these organisms man refers to as pests becomes a necessary prelude to any attempt to justify the use of pesticides.

First, let us pause to reflect on the basic biological fact that in nature every living creature is engaged in the most ruthless competition with every other living organism upon which its interests impinge. Man, as a part of that environment, is no exception. That he has been eminently successful is evidenced by the fact that the human population of this country has risen from less than one million to over 170 million in some fifteen to twenty generations.

Be that as it may, rest assured the insects, plant diseases, nematodes, weeds, rodents and their allies have not given up the battle. Man has annihilated whole armies of his own species, Homo sapiens. Civilizations have come and gone. But it is doubtful if man has exterminated, except in local areas, a single one of those competing species we call pests.

The maintenance and improvement of the present nutritional status of the American public is contingent upon the continued production of an adequate food supply. Plant and animal pests rank among the foremost causes of food destruction, food deterioration and food contamination. Hence, the absolute necessity of protecting growing crops and products from serious attack by insects, plant diseases and other pests is recognized as essential from the standpoint of both quantity and quality of the food produced.

Cultivated crops grown in North America are attacked by over 3,000 economically important species of insects, as many plant disease agents, and unestimated numbers of nematodes, rodents, weeds and other competitors. In 1954, the U.S. Department of Agriculture estimated that to offset the pest losses in agricultural production, an extra 88 million acres must be cultivated, and that losses subsequent to harvest equal the production of an additional 32 million acres.

Estimates of the destruction caused by agricultural pests made independently by several other agencies range somewhere between 8 and 15 billion dollars annually—a quarter of our annual production—and this despite the widespread use of the best control practices now available.

Here again we are confronted with the general acceptance of a completely false concept. As new and better pesticides and methods of application were developed, they were evaluated in comparison with the best procedures in current use. Completely untreated checks were seldom used, and so progress has been measured in short steps.

Thus, all that science has accomplished to date in the field of pest control is largely taken for granted and generally accepted as natural or normal.

Every farmer knows that in the absence of insect and disease control the commercial production of most if not all fruit and vegetable crops would be impossible.

He knows also that if weeds are not controlled they will take over completely and there would be no crop production whatever.

Even the metropolitan city dweller should have deduced that fact from his personal observations of what takes place when vacant lots, flower beds, lawns or parks are neglected. Anyone who has lived or even spent much time in the country knows that when a piece of land is abandoned weeds take over and that gradually over the years it will revert to its original wild and natural status.

Obviously if all efforts to control pests were to be abandoned in this country, our agricultural lands would soon revert to the conditions that prevailed prior to the advent of the white man. Under those conditions the North American continent supported a human population of about 1,000,000 souls. If we were to adopt a policy of "Let nature take its course," as some individuals thoughtlessly advocate, it is possible the experts would find disposing of the 200,000,000 surplus human beings even more perplexing than the disposition of the infamous wheat surplus.

You may well ask, "If all this is true, why all the present commotion and misunderstanding concerning pests and pest control problems?" Here again, a recapitulation of agricultural history will help us understand the present.

When the first white men came to North America they found a race of rather primitive men living in reasonable harmony with a relatively stable environment. Under these conditions, this continent supported a population of about one million persons and provided in excess of 2,000 acres per capita.

Then, as now, literally dozens of pests of all classes attacked every crop that grew and neither man nor beast escaped their ravages. In the years that followed, with agriculture on a subsistence basis and a seemingly endless supply of land available, there was plenty for all and farmers raised only feeble objections to sharecropping with the insects and other pests. Later, as urban populations increased, each individual farmer was called upon to meet the food and fiber requirements of an ever-increasing number of individuals and to do so on an ever-decreasing number of acres per capita.

This trend continued until at present we have only about ten acres per person, seven of which are classified as farm land, but only two of which are devoted to crop production.

These pressures will now intensify more rapidly because of the fact we have at last absorbed and brought into production most of the lands suitable for agricultural production. As a matter of fact, 1954 marked a turning point in our history, because then, for the first time, the withdrawal of agricultural land for use as home or industrial sites, airports, and highways exceeded the land reclaimed, and the number of acres in farms showed a decline.

Many factors have contributed to the increased prevalence and destructiveness of insects, weeds, fungi, bacteria, nematodes and viruses during the past 100 years:

(1) As farmers began to use the same fields over and over, the pests had less and less difficulty finding suitable host plants.

(2) After several generations certain pests which at first rarely attacked cultivated crops developed an appetite for newly introduced plants and became so well adapted to the new environment that they became extremely destructive.

(3) The breeding of crops for increased yields, uniformity and many other desirable characteristics, was in many instances accompanied by an increased susceptibility to one or more pests.

(4) To make matters worse, the pioneers brought with them a number of insect pests previously unknown to Illinois. Still other species arrived later as undesirable immigrants from other parts of this country and even from abroad. As a matter of fact, by far the majority of our most destructive pests are of foreign origin.

We must also note that in many cases serious losses that have gone undetected for many years are considered as new problems when they are discovered and the causal agent becomes known.

Then, too, we cannot overlook the fact that standards of food acceptance have been drastically raised. The modern housewife would not look twice at produce that was readily accepted 50 years ago. Actually, the products of 50 years ago would not come close to meeting present grade standards established by the U.S. Department of Agriculture. Much of the insect and rodent contaminated food acceptable years ago could not even move in interstate commerce under current food and drug laws.

In the beginning, although complaining bitterly at times, farmers generally had little choice but to rely upon nature to control the pests that were ravaging their crops and livestock. Then as losses mounted and the standards of perfection demanded by an increasingly more discriminating consuming public rose, the farmers began to clamor for governmental aid and scientific guidance in the solution of the pest control problems.

The early state and federal entomologists, botanists and crop specialists were essentially naturalists. They preached a gospel of biological and cultural pest control methods. For years such measures dominated all pest control endeavor, for these early officials had no other course open to them.

Diligent efforts were made and are still being made to control insects and diseases by good cultural practices. Plant pathologists and entomologists generally recommend that old crop refuse be plowed under or destroyed if pests live over the winter in it. Rotations with other crops are urged wherever possible, not only to starve out pests but also to maintain balanced fertility and to put organic matter back in the soil.

Producers of specialty and seed crops diligently search for geographical areas where certain pests are not known to occur and for fields where disease and insect pests are not likely to strike. Insofar as it is practical, farmers try to observe planting dates that will be most unfavorable for specific pests and, finally, strenuous efforts are being made to breed crops for resistance to diseases and insects.

While some astounding achievements have been attained through such research, the development of resistant varieties of plants has important practical limitations. All too of-

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ten the resistant varieties may prove effective against specific strains of a fungus for a limited time only. Then the fungus develops a new strain that these plants can no longer tolerate or resist. Experience has shown that a disease-resistant variety of oats or wheat will last about 10 or 15 years, at most, before a new strain of the parasitic fungus develops and attacks the variety.

The introduction and dissemination of parasites, predators and disease organisms have proved advantageous in controlling some insects but these practices have very definite limitations.

As the needs for better pest control grew and it became increasingly apparent natural and cultural control measures alone were grossly inadequate, the farmers themselves turned to the use of chemicals which showed promise. Scientists reluctantly were forced into the position of following their lead. Thus we entered an age of chemical pest control.

The large-scale practical usage of pesticides is in reality one of the important technological developments of the 20th century. While it is true that numerous nondescript concoctions of lye, lime, soap, turpentine, brine, vinegar, fish oil and even some tobacco, pyrethrum powder, mineral oil and arsenic were reportedly used as insecticides prior to the year 1800, the quantities of pesticides used prior to 1850 were quite insignificant. Between 1840 and 1885 sulfur and Bordeaux mixture came into use for the control of mildew on grapes in Europe.

The really effective use of agricultural insecticides had its origin with the first use of Paris green to control the Colorado potato beetle in 1867. As uses for Paris green and related materials were expanded to include control of the codling moth, cankerworms, the cotton leafworm and many other leaf-feeding species, insecticide usage increased rapidly. As one would expect, use of pesticides developed most rapidly in the case of crops with a high per-acre value, notably fruits and vegetables.

Pesticide production in the U.S., which had increased to a level of several million pounds annually by 1900, continued to grow steadily until near the end of World War II. Release then of many new and highly effective pesticidal chemicals, developed through extensive wartime research, sent pesticide production and use skyrocketing.

The rise in pesticide usage has been closely associated with and has run parallel to advances in farm mechanization. Thus, in these days of automation and labor-saving devices, many farm managers have come to regard pesticides as chemical tools and they think of them in the same light as mechanical tools.

No one knows what would happen if the use of pesticides were to be prohibited or abandoned, but it is safe to say fruits and vegetables either would totally disappear from the market or the price of the meager quantities produced would soar to levels where they would be classed as luxuries available only to the rich.

We know from valid studies conducted over the years that apples produced without pesticide protection will be 40 to 80% damaged by codling moth and 60 to 80% damaged by apple scab, plus an equal or even greater degree of damage to fruit caused by innumerable other insects and diseases. To this we must add the destruction wrought by wood borers, scale insects and other pests that result in the devitalization and eventual destruction of the trees themselves.

At this point it should be noted that loss estimates by biologists are often unjustifiably criticized by statisticians and laymen alike. They point out that at times, according to reports, insects have taken 60%, diseases 50%, weeds 30% and nemodes 10% of a specific crop—a total of 150%— and still the grower has a fair harvest. In the case of most fruit and vegetable crops, such values are not necessarily additive, e.g. many individual fruits may have been rendered unsalable by both insects and diseases and control of both would be essential to the production of a marketable crop.

More important, however, is the fact that potential production for many crops is rarely if ever attained and is often unknown. Thus, we are prone to think of average annual yields as normal, and totally ignore the fact that with all pests adequately controlled, yields might be doubled, or at least greatly increased.

Let us consider the case of the lowly Irish potato. It so happens potatoes have not been successfully produced without the use of insecticides since 1867. Potato growers thought they had about attained maximum potato yield in the early 1940's, but they were unaware that the copper compounds used to repel leafhoppers and control plant diseases were retarding yields. Then with the advent of DDT and the new carbamate type fungicides which replaced the copper compounds, potato yields practically doubled in 5 years' time.

In our pastures and meadows today, as in years gone by, we frequently produce more insect protoplasm than animal weight gains per acre. In some pastures it is obvious unused weed growth exceeds the production of palatable forage. Obviously we are still share-cropping with insects and weeds. So long as surpluses prevail, this is permissible, but the day may not be far distant when such inefficiency can no longer be tolerated.

Without the benefit of pesticides, the yield of staple fiber, cereal and forage crops could be expected to drop by from 10 to as much as 25%. In two separate studies data accumulated by the U.S. Department of Agriculture over periods of 34 and 20 years showed that the omission of insecticide treatments reduced cotton yields 25.5 to 41.8%, respectively.

Agronomists at the University of Illinois have demonstrated quite conclusively that a given acre of land is able to produce about so much dry matter in any given season. Therefore, whatever is wasted in weed production must be subtracted from the crop. With weeds partially uncontrolled, crop yields would certainly be reduced and with weeds completely uncontrolled yields would be nil.

There are those who say we should revert to the use of those partially effective control methods used before the advent of pesticides. That is impossible.

Farming has risen to the status of Big Business. Modern agricultural practices demand maximum efficiency. Unlike conditions 20 to 30 years ago, capital investments on farms today are so large the growers can no longer afford occasional complete or even partial crop failures and still stay in business. The days of the hoe, hand picking of potato bugs and the maintenance of dusty furrow barriers for the control of chinch bugs and armyworms are gone forever.

If America wants its farmers to be reduced to the status of those in the so-called under-developed countries, the abolition of pesticides would be a logical first step.

I know of no other group of chemical or mechanical tools used by so many different people under so many diverse conditions that comes even close to the safety record established in the field of pesticide usage. True, we have had our cranberry fiasco and other incidents. However, these involved minor errors in judgment and misuse. None has posed a real public health hazard.

WAGE AGREEMENT

LOS ANGELES—United States Borax & Chemical Corp. and the Wilmington (Cal.) Local 40, International Chemical Workers Union (AFL-CIO), have agreed on a new contract providing for an average wage increase totaling 25¢ an hour over a two-year period, according to a joint announcement by the company and the union.

Agreement on the new contract was reached early Sunday morning, May 1, after an all-night bargaining session. The old contract expired at midnight, Saturday, April 30.

The new pact, effective May 1, applies to all hourly-paid employees at the United States Borax & Chemical Corp. plant at Wilmington.

The 25¢ package parallels a two-year contract signed last month with the Boron (Cal.) Local 85, International Chemical Workers Union (AFL-CIO). It represents a 4% increase over present base wage rates during each of the two years of the contract, plus payment by the company of additional premiums for hospital-medical-surgical costs.

Geigy Adds Representative In Southern Territory

ARDSLEY, N.Y. — Geigy Agricultural Chemicals Division of Geigy Chemical Corp. has announced the appointment of William G. Westmoreland as its sales representative in North and South Carolina, East Tennessee and north Georgia.

W. G. Westmoreland

Mr. Westmoreland formerly was agronomy specialist in weed activities with the North Carolina extension service. He graduated from North Carolina State College in 1950 with a degree in animal husbandry. Following a year as an assistant county agent he returned to N.C. State College and was granted his master of science in agronomy in 1953.

Mr. Westmoreland is active in the Southern Weed Conference and in the Weed Society of America. He makes his headquarters in Raleigh, N.C.

Suit Seeks to Prevent Enforcement of New Florida Pesticide Rules

JACKSONVILE, FLA.—Legal action was begun in Circuit Court here May 6 to prevent the State Board of Health from enforcing new rules on usage of pesticides in Florida. (An earlier story about the new regulations appears on page 13.)

Richard L. Lewis as an individual and a member of the Florida Pest Control Assn., with headquarters in Orlando, joined with the association in bringing the suit, which asks a court decree declaring the health board's action unconstitutional and an injunction to bar enforcement of the rules.

Filing of the suit followed a public hearing after which implementation of the new regulations was ordered. The board adopted the resolutions in February. Following the hearing 12 pesticides considered dangerous by health authorities were placed on a restricted usage list.

The suit, filed for the association and Mr. Lewis, asks Judge Edwin L. Jones to:

Issue a temporary injunction on enforcement of the new regulations.

Declare the new rules beyond the power of the health board to promulgate. It says this authority comes under the State Department of Agriculture.

Declare that the rules are an unlawful usurpation of the state's police power.

Declare the rules violate the due process clause of the Florida Constitution by being unreasonable, arbitrary, capricious, vague and indefinite.

ADDS DEPARTMENT

BIRMINGHAM, ALA. — A garden supply department has recently been added to the W. A. Belcher Lumber Co., 2305 Jefferson Ave.

Armour Opens New Plant in Missouri

CENTRALIA, MO.—Armour Agricultural Chemical Company's new liquid and dry fertilizer plant near Centralia, Mo., is now open. Located four miles west of Centralia on U.S. Highway 22, the new plant will serve an area within an approximate 50-mile radius of that central Missouri city.

Complete liquid fertilizers and bulk, dry fertilizer, custom-formulated to farmers' specifications, will be offered at the Centralia plant, along with analyses of Pebble Plant Food in bags and bulk, liquid and solid nitrogen materials and Armour's Vertagreen plant foods.

The new plant is equipped to offer custom application of liquid and dry bulk fertilizers and will have available on a rental basis equipment for the application of these materials. Jack Troyer of Centralia is Armour's sales representative at the new plant.

Armour Agricultural Chemical Co. has 32 fertilizer-manufacturing plants throughout the U.S. and in Cuba and Puerto Rico.

Fire Damages Texas Pesticide Plant

COMMERCE, TEXAS — A fire which burned for hours at the Hi-Yield Chemical Co. did considerable damage and for awhile threatened a nearby feed store and gin. The plant was an old cottonseed oil mill and produced cotton pest chemicals. The home office of the company is at Bonham, Texas.

Firemen estimated that from 300 to 450 explosions hampered their work during the first three hours of fighting the blaze. The blasts, most of them small, posed added dangers to firemen because the fumes burned their skin, lungs and eyes.

About six persons were working in the building when the fire started, but all escaped safely. During the fire about $500 worth of fire hose was destroyed.

Tolerances Established For Ethion Insecticide

MIDDLEPORT, N.Y. — Establishment of tolerances for ethion insecticide has been announced by Niagara Chemical Division, Food Machinery & Chemical Corp.

According to label claims, the insecticide can be used on beans, melons, green onions and strawberries. The registrations reflect the Food & Drug Administration's recent acceptance of tolerances of 1 ppm for residues on these crops, the company says. The product had already been approved for use on a number of field, truck and fruit crops.

Washington Firm

SEATTLE — Evergreen Dehydrating Co. has been incorporated here to manufacture and distribute all types of fertilizer. Incorporators are Ray Parcher, George Chandler, Jr. and A. L. Chandler, all of Seattle.

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All About Insect Plagues . . .

Locusts Undergo Changes in Personality, Color . . . Do Damage Other Than to Crops

SINCE BIBLICAL times locusts have plagued countries ranging from India in the east to the regions of Africa bordering the South Atlantic Ocean. This pest has intermittently brought hardship and famine over thousands of miles in the course of thousands of years.

So far, the locust has beaten man not only because of its unique habits, defensive and offensive, but largely because of man's inability to reach a working agreement in which the full weight of scientific and technical knowledge can be used to fight this pest.

But with the recent signing of the agreement between the United Nations Special Fund authorities and the representatives of 14 countries in the front-line of the war against the desert locust, there is a chance that the plagues may, in the not too distant future, be brought under control. If so, then much of the credit must go to a handful of men who have devoted their lives to combatting the locust. Among these are Dr. B. P. Uvarov, Dr. Tashkir Ahmad, O. B. Lean and many others.

At the headquarters of the Food and Agriculture Organization (FAO), in Rome, the chairman of a recent special FAO desert locust meeting was Dr. Tashkir Ahmad, director of the plant protection department of the Ministry of Agriculture, Pakistan. Despite many fears and apprehensions arising from numerous political, social and economic considerations, these were smoothed away and agreement was reached on the special fund desert locust project. (Under this agreement the special fund will contribute about $2,500,000 while the governments between them will contribute in cash something over $1,370,000.) This total of a little under $4,000,000 is to be spent during the next six years, much of it for research and investigation and a fair amount of it for using new techniques against locusts wherever they threaten to swarm.

Dr. Ahmad, group chairman, discussed some of the characteristics of the desert locust.

"It is," he said, "probably the longest migrating insect on earth. It can travel up to 100 miles a day and can go on for six or seven days—that is six or seven hundred miles practically without eating. It has a wide range of tolerance to temperatures and at 115°F. feels quite happy and at home when other insects are beginning to expire from the heat. It can also withstand the low night temperatures that come in the desert. In fact, the desert locust enjoys the heat and dryness of the atmosphere of the desert, and needs the moisture to be found in the soil to hatch its eggs.

"Furthermore," Dr. Ahmad went on, "the desert locust probably has fewer enemies than any other creature—almost none of any importance as far as we know. It also has an extremely interesting life cycle consisting of two phases. In the first, it lives a solitary existence. Its hoppers are yellow or greenish yellow in color which gives them excellent camouflage but on multiplication they change, becoming gregarious and taking on a bold yellow and black color.

"As a young insect it is sedentary by nature, lazy and wants to hide. As soon as it gets together with other locusts, however, it becomes gregarious, bold and very active. These characteristics add to the difficulty of combatting locusts because it is difficult to discover them in their solitary phase and there is little time to deal with them once they start to swarm and migrate."

Dr. Ahmad said that when locusts swarm they not only eat every living bit of vegetation but can do tremendous damage in other respects. Swarms crossing the sea have been known to settle on small boats and sink them.

"This seems extraordinary, but a locust swarm may weigh hundreds of tons," explained Dr. Ahmad, "and such a weight falling on a small fishing boat or any small vessel is disastrous. Similarly, when swarms alight on trees they break the branches and whole orchards or woodlands may be destroyed."

Dr. Ahmad, who attended the Agricultural College at Lyallpur (Punjab) on a scholarship, won the Sir John Wilson medal in taking his B.Sc. He went to work in the locust section of the Agriculture Department for the Government of Punjab before going to Cambridge University, England, in 1933.

He was an unusual student, arriving with locust eggs which were then hatched artificially at the University and experiments were carried out at controlled temperatures. Dr. Ahmad was awarded his doctorate in Philosophy after 1½ years at Cambridge, a rare achievement as usually the minimum time is two years. From the University he joined the Imperial Agricultural Institute at New Delhi as an assistant entomologist and by 1945 was the Imperial Entomologist for all India. At the partition, he went to Pakistan where he is now director of the Plant Protection Department. As director he is concerned with all crop pests but the locust remains his great interest. He is one of the world's authorities on the life cycle of the insect and has taken part in many experiments to discover the secrets of this persistent pest.

"We were interested to find out what made the solitary green hoppers of locusts turn black when they met other hoppers," he said. "In one experiment we put two green hoppers in a glass and the effect socially was that they both became black. When we separated them, they reverted to their original green. As a further test we put a hopper in a space surrounded by mirrors and the sight of himself caused him to jump excitedly and eventually change color. It became obvious that the black pigment was due to muscular activity, a conclusion which was further supported by an experiment in keeping the hopper on the move by artificial means, as a result of which the creature turned black."

Dr. Ahmad is a fervent supporter of international action in combatting the desert locust.

"The only possible way we can overcome this pest is by combining our resources to fight him," he said. "Every country must contribute if we are eventually to suppress the plagues. Several years ago, for example, there was difficulty in interesting the Saudi Arabians but now, as a result of governmental agreements, there are eight locust teams operating in Saudi Arabia from neighboring and other countries, hand in hand with efficient Saudi Arabian teams.

(Turn to EDITORIAL, page 23)

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price 25¢.

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Nov. 2-4—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.

Meeting Memos listed above are being listed in this department this week for the first time.

June 1-2—Conference on Roadside Erosion Control, Cartersville, Ga.

June 7—Field Day, University of Maryland Agronomy-Dairy Forage Research Farm, Ellicott City, Md.

June 9—Executive Committee Meeting, Fertilizer Section, National Safety Council, College Inn Motor Lodge, Raleigh, N.C.

June 9-11—Manufacturing Chemists' Assn. 88th annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 12-15—National Plant Food Institute annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

June 13-16—Western Society of Soil Science meeting, University of Oregon, Eugene, Oregon.

June 21-22—Eighteenth Annual Convention, Association of Southern Feed & Fertilizer Control Officials, Riverside Hotel, Gatlinburg, Tenn. For further information, write Maurice B. Rowe, secretary-treasurer, Department of Agriculture, 1119 State Office Building, Richmond 19, Va.

June 25—Del-Mar-Va Peninsula Fertilizer Assn., Annual Convention, George Washington Hotel, Ocean City, Md.

June 27-29 — Northwest Section, American Society of Range Management summer meeting, John Day, Oregon.

June 27-29—Pacific Branch, Entomological Society of America, Davenport Hotel, Spokane, Wash.

July 11-13—North Central Agronomy Society, Summer meeting, University of Minnesota Farm Campus, St. Paul, Minn.

July 13-15—Eleventh Annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City; B. B. Bertramsen, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

July 27-30—Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Texas.

Aug. 2-3 — Ohio Pesticide Institute, Ohio Agricultural Experiment Station, Wooster, Ohio.

Aug. 10-11—Northeast Regional Fertilizer Safety School, Park Sheraton Hotel, New York City.

Aug. 15-23 — Seventh International Soil Science Congress, University of Wisconsin, Madison, Wis., Prof. Emil Truog, Congress Manager, Soils Building, College of Agriculture, Madison 6, Wis.

Aug. 16-17—Midwest Regional Fertilizer Safety School, National Safety Council Headquarters, Chicago.

Aug. 21-25 — Canadian Fertilizers Assn., annual convention, Manoir Richelieu Hotel, Murray Bay, Quebec, Canada. H. H. Skelton, P.O. Box 147, Hochelaga Station, Montreal, Que., Canada, general chairman.

Aug. 25-27—Southeast Regional Fertilizer Safety School, Wilmington, N.C.

Aug. 25-27—Mississippi Soil Fertility and Plant Food Council, 1960 meeting, Buena Vista Hotel, Biloxi, Miss.

Sept. 24-26 — Western Agricultural Chemicals Assn., 31st annual meeting, Palm Springs Riviera Hotel, Palm Springs, Cal.

Sept. 27-29—Annual meeting of National Agricultural Chemicals Assn. for 1960, Hotel del Coronado, Coronado, Cal.

Sept. 29-30—Northeast Fertilizer Conference, Hotel Hershey, Hershey, Pa.

Oct. 5-6—Southeast Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 10-11 — Second Annual 4-State Aerial Applicators Conference, Hotel Chinook, Yakima, Wash., Norkem Corp. is sponsor.

Oct. 17-21—48th annual National Safety Congress, Fertilizer Section, LaSalle Hotel, Chicago.

Oct. 31-Nov. 3—International Crop Improvement Assn. meeting, Denver, Colo.

Nov. 3-4—Annual fall convention, Pacific Northwest Plant Food Assn., Boise, Idaho.

Nov. 9-11—National Fertilizer Solutions Assn., 1960 Convention, Memphis, Tenn.

Nov. 13-15—California Fertilizer Assn., 37th annual meeting, del Coronado Hotel, Coronado, Cal.

Jan. 11-13 — Agricultural Ammonia Institute, 10th annual convention, Memphis, Tenn.

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KILL SUBMERSED WATER WEEDS which foul up motor propellers, tangle fishing gear, with R-H WEED RHAP, Granular 2,4-D. Inexpensive, easy to use, sure results. For free information write Reasor-Hill Corporation, Box 36CL, Jacksonville, Arkansas.

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Pink Bollworm Hearing Scheduled in Arkansas

LITTLE ROCK, ARK.—The Arkansas Legislative Council will hold a public hearing at 10 a.m. May 19 at Little Rock to study the problem of controlling the pink bollworm in the state.

The meeting was set at the recommendation of Rep. Milton Willis of Crawford County, who took part in a study of pink bollworm control programs in Oklahoma and Texas.

Mr. Willis said Arkansas is spending approximately $150,000 a year on a control program "for something we don't even know we have."

IMC's Earnings Show 47% Gain in 9 Months

CHICAGO—International Minerals & Chemical Corp. has reported net earnings of $2,318,358 or 94¢ a share on the 2,364,592 common shares outstanding for the third quarter ended March 31, 1960.

This is a 13% gain over earnings of the corresponding period a year ago. Sales for the quarter just ended totaled $34,121,475, up 11% over the $30,721,917 for the third quarter of the 1958-59 fiscal year.

Classified Ads

Classified advertisements accepted until Tuesday each week for the issue of the following Monday.

Rates: 15¢ per word; minimum charge $2.25. Situations wanted, 10¢ a word; $1.50 minimum. Count six words of signature, whether for direct reply or keyed care this office. If advertisement is keyed, care of this office, 20¢ per insertion additional charged for forwarding replies. Commercial advertising not accepted in classified advertising department. Display advertising accepted for insertion at minimum rate of $11 per column inch.

All Want Ads cash with order.

MACHINERY FOR SALE

FOR SALE—TWO 15,000 GAL. TANKS; one 10,000 gal. tank. Used for fuel oil. Good condition. Write for specification. W. E. Kerr, 1109 N. Mulberry, Mt. Vernon, Ohio.

HELP WANTED

CHEMIST—EXPERIENCE IN FORMULATION and quality control of insecticides, fungicides and herbicides. Well established manufacturer located and operating in the Middle Atlantic area has need for two chemists in its current expansion program. Send letter stating training, experience and salary expected to Ad No. 5781, Croplife, Minneapolis 40, Minn.

EDITORIAL

(Continued from page 22)

"We have made headway in our international fight against the locust," he continued. "Once famines followed the locust plagues but now disasters are a rare occurrence. In our new scheme we should, in the next six years, be able to carry out enough investigation and research to take the most effective action against the desert locust."

One of the latest ideas is to use the exhaust of "land rovers" to help spread poison over areas infected by hoppers. A new attack, using aldrin, has been effective.

In his own country, Dr. Ahmad has enormously enlarged the scope and work of the Plant Protection Department. In 1948 it had a budget of $17,000 as compared to the present budget of $6,000,000.

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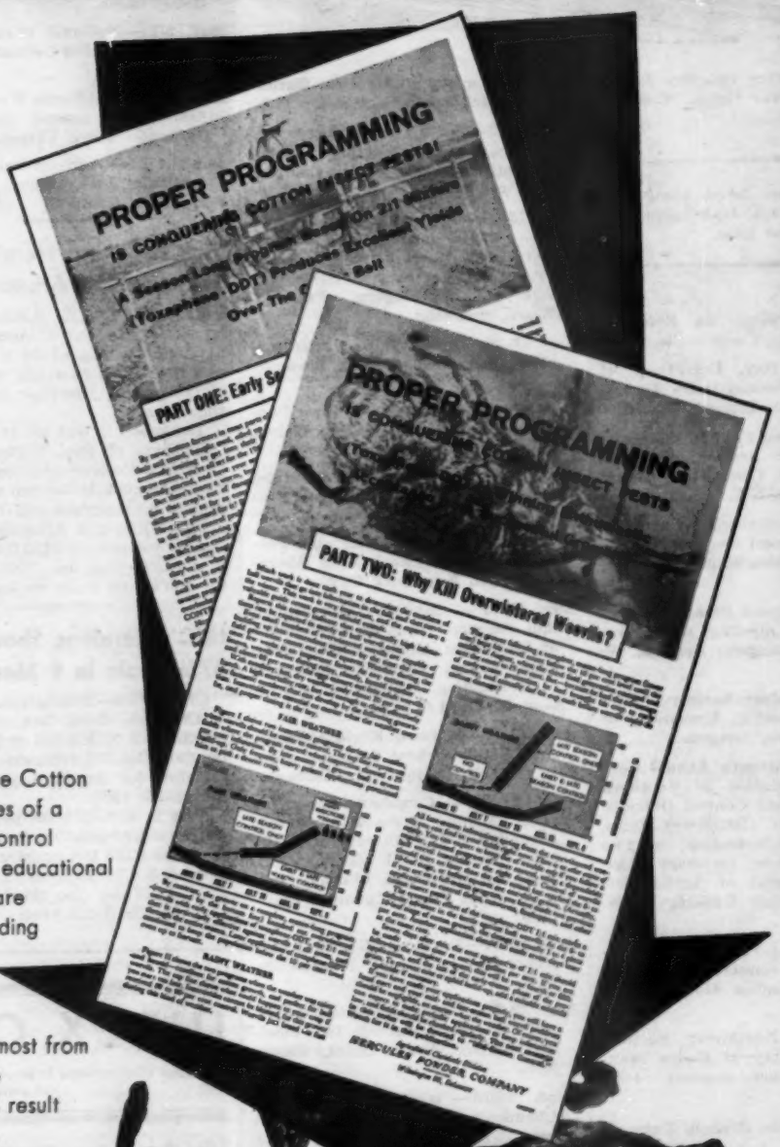
How Hercules helps promote better insecticide usage



To help farmers throughout the Cotton Belt understand the advantages of a planned, season long insect control program based on toxaphene, educational advertisements such as these are currently appearing in the leading farm publications.

Reaching more than two million readers monthly, they help the farmer get the most from his insecticide dollar, increase confidence in insecticides and result in improved sales for dealers.

Agricultural Chemicals Division
Naval Stores Department
HERCULES POWDER COMPANY
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900 Market Street, Wilmington 99, Delaware

TOXAPHENE